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ANNUAL REPORT

IN RELATION TO THE

Criminal Business of the Courts

OF THE

STATE OF CONNECTICUT,

FOR THE

Year Ending July 1, 1890,

As Shown by the Returns of the State Attorneys.

COMPILED BY THE COMPTROLLER.

PRINTED BY ORDER OF THE LEGISLATURE.

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State of Connecticut.

STATE OF CONNECTICUT,
COMPTROLLER'S OFFICE,

HARTFORD, November 15, 1890.

To His Excellency, the Governor:

Complying with the statute, I herewith submit the annual reports of the State Attorneys, concerning the criminal business of the courts for the year ending July 1, 1890.

The whole number of prosecutions for different crimes was seven hundred and forty-five (745), a decrease of one hundred and fifty-six (156) as compared with the preceding year. Total number of cases disposed of fourteen hundred and fifty (1450), a decrease of eighteen (18). Total number of convictions, one hundred and thirty-four (134), an increase of forty-one (41) over the preceding year.

The amount of forfeited bonds reported is seventeen thousand and fifty dollars ($17,050). The amount for the preceding year was nineteen thousand one hundred and fifty-five dollars.

Respectfully submitted,

JOHN B. WRIGHT,
Comptroller.

REPORTS OF THE STATE ATTORNEYS.

STATE OF CONNECTICUT,

OFFICE OF STATE'S ATTORNEY FOR HARTFORD COUNTY.

To the Comptroller:

SIR:—Herewith I send you a statement of the business of this office for the year ending July 1st, 1890:

Total number of cases disposed of during the year,		148
Of these cases 122 were in court for 1 term.		
1 was in court for 18 terms.		
1 was in court for 14 terms.		
2 were in court for 10 terms.		
1 was in court for 8 terms.		
1 was in court for 5 terms.		
1 was in court for 4 terms.		
6 were in court for 3 terms.		
13 were in court for 2 terms.		
Total number of trials during the year,		10
As to the persons tried, the results were as follows:		
Number of persons convicted,	8	
Number of persons acquitted,	0	
Number of persons as to whom the jury disagreed,	2	
Total number of persons tried,		10
Total number of persons who pleaded guilty,		96
Total number of forfeited bonds,		1
Total amount of forfeited bonds,		$250
Total number of *nolles* absolute,		39
Total number of *nolles* on terms,		12
Number of original informations,		73
Number of appealed cases,		59
The appealed cases were disposed of as follows:		
By verdict of jury,		1
By plea of guilty,		27
By *nolle* absolute,		21
Number disposed of upon payment or part payment of fine below and cost,		10

Whole number of prosecutions for different crimes, . .	148
Number of second convictions for the same crime, . . .	0
Number of third convictions for the same crime, . .	1

ARTHUR F. EGGLESTON,

State's Attorney for Hartford County.

NEW HAVEN COUNTY.

To the Comptroller:

SIR:—Herewith I send you a statement of the business of this office for the year ending July 1st, 1890:

Total number of cases disposed of during the year, . . .	122
Number of terms they were in court—1 for 12 terms; 1 for 11 terms; 9 for 4 terms; 20 for 2 terms; 91 for 1 term.	
Total number of trials and their results:	
Number of convictions, ...	41
Number of acquittals (on ground of insanity), . .	3
Number of cases in which there was disagreement of jury,	3
Number of pleas of guilty, ...	48
Bonds forfeited:	
Number, ...	3
Amount, ...	$425
Number of *nolles* absolute, ...	40
Number of *nolles* upon terms, ...	5
Number of original informations, ...	104
Appealed cases and their disposition by verdict:	
Number by verdict, ...	none.
Number of pleas of guilty, ...	none.
Number of *nolles* absolute, ...	none.
Number disposed of upon payment or part payment of fine below and cost, ...	none.
Whole number of prosecutions for different crimes, . .	122
Number of second convictions for the same crime, . .	none.
Number of third convictions for the same crime, . .	none.

TILTON E. DOOLITTLE,

State's Attorney for New Haven County.

To the Comptroller:

SIR:—Herewith I send you a statement of the business of this office for the year ending July 1, 1890:

Total number of cases disposed of during the year,	93
Number of terms they were in court—78 for 1 term; 15 for 2 terms.	
Total number of trials and their results:	
Number of convictions,	3
Number of acquittals,	2
Number of cases in which there was disagreement of jury,	1
Number of pleas of guilty,	15
Bonds forfeited:	
Number,	2
Amount,	$100
Number of *nolles* absolute,	49
Number of *nolles* upon terms,	24
Number of original informations,	2
Appealed cases and their disposition by verdict:	
Number by verdict,	4
Number of pleas of guilty,	none.
Number of *nolles* absolute,	44
Number disposed of upon payment or part payment of fine below and cost,	23
Whole number of prosecutions for different crimes,	not given.
Number of second convictions for the same crime,	"
Number of third convictions for the same crime,	"

Thirty-three of the 49 *nolles* absolute were *nolled* without costs, as they should have been joined with other complaints pending.

GEORGE E. TERRY,

Assistant State's Attorney for New Haven County.

WATERBURY, July 29, 1890.

To the Comptroller:

SIR:—Herewith I send you a statement of the business of this office for the year ending July 1, 1890:

Total number of cases disposed of during the year,	233

Number of terms they were in court—162 for 1 term; 39 for 2 terms; 12 for 3 terms; 6 for 4 terms; 5 for 5 terms; 2 for 7 terms; 4 for 8 terms; 2 for 11 terms; 1 for 12 terms.

Total number of trials and their results:

Number of convictions,	19
Number of acquittals,	14
Number of cases in which there was disagreement of jury,	5
Number of pleas of guilty,	40
Bonds forfeited:	
Number,	38
Amount,	$5,200
Number of *nolles* absolute,	46
Nnmber of *nolles* upon terms,	63
Number of original informations,	none.
Appealed cases and their disposition by verdict:	
Number by verdict,	33
Number of pleas of guilty,	40
Number of *nolles* absolute,	46
Number disposed of upon payment or part payment of fine below and cost,	63
Whole number of prosecutions for different crimes,	not given.
Number of second convictions for the same crime,	"
Number of third convictions for the same crime,	"

GEO. M. GUNN,

Pros. Atty. Court of Common Pleas for New Haven County.

NEW LONDON COUNTY.

To the Comptroller:

SIR:—Herewith I send you a statement of the business of this office for the year ending July 1, 1890:

Total number of cases disposed of during the year,	103
Number of terms they were in court—58 for 1 term; 28 for 2 terms; 6 for 3 terms; 7 for 4 terms; 4 for 5 terms.	
Number now remaining on the docket,	7
Total number of trials and their results:	
Number of convictions,	8
Number of acquittals,	2
Number of cases in which there was disagreement of jury,	none.
Number of pleas of guilty,	22
Bonds forfeited:	
Number,	6
Amount,	$1,550

Four bonds have been settled as stated in my account; the other two I have been unable to collect or settle.

Number of *nolles* absolute,	27
Number of *nolles* upon terms,	15
Number of original informations,	39
Appealed cases and their disposition by verdict:	
Number by verdict,	3
Number of pleas of guilty,	2
Number of *nolles* absolute,	15
Number disposed of upon payment or part payment of fines below and cost,	10
Whole number of prosecutions for different crimes,	83
Number of second convictions for the same crime,	none.
Number of third convictions for the same crime,	none.

SOLOMON LUCAS,

State's Attorney for New London County.

To the Comptroller:

SIR:—Herewith I send you a statement of the business of this office (Criminal Court of Common Pleas), for the year ending July 1, 1890:

Total number of cases disposed of during the year,	99
Number of terms they were in court—59 for 1 term; 37 for 2 terms; 3 for 3 terms.	
Number now remaining on the docket,	3
Total number of trials and their results:	
Number of convictions,	4
Number of acquittals,	1
Number of cases in which there was disagreement of jury,	3
Number of pleas of guilty,	3
Bonds forfeited:	
Number,	8
Amount,	$950

Four bonds have been settled, as appears by my account; the other four I have been unable to collect or settle.

Number of *nolles* absolute,	16
Number of *nolles* upon terms,	54
Number of original informations,	2
Number of appealed cases and their disposition by verdict,	not given.
All cases come to this court by appeal.	
Whole number of prosecutions for different crimes,	102
Number of second convictions for the same crime,	none.
Number of third convictions for the same crime,	none.

SOLOMON LUCAS,

State's Attorney for New London County.

FAIRFIELD COUNTY.

To the Comptroller:

SIR:—I herewith send you a statement of the business of this office for the year ending July 1, 1890:

Total number of cases disposed of during the year, . . 181
Number of terms they were in court—143 for 1 term; 10 for 2 terms; 8 for 3 terms; 6 for 4 terms; 3 for 5 terms; 1 for 6 terms; 1 for 7 terms; 1 for 8 terms; 3 for 9 terms; 5 for 10 terms.

Total number of trials and their results:
Number of convictions, ... 16
Number of acquittals, ... 4
Number of cases in which there was disagreement of jury, none.
Number of pleas of guilty, ... 82

Bonds forfeited:
Number, ... 5
Amount, ... $525
Number of *nolles* absolute, ... 68
Number of *nolles* upon terms, ... 6
Number of original informations, ... 8

Appealed cases and their disposition by verdict:
All appealed cases are now tried in Court of Common Pleas, criminal side. Ninety-five cases were transferred to that Court, September term, 1889.

Whole number of prosecutions for different crimes, . not given.
Number of second convictions for the same crime, . "
Number of third convictions for the same crime, . "

SAMUEL FESSENDEN,
State's Attorney for Fairfield County.

To the Comptroller:

SIR:—Herewith I send you a statement of the business of this office for the year ending July 1, 1890:

Total number of cases disposed of during the year, . . 185
Number of terms they were in court—66 for 1 term; 43 for 2 terms; 17 for 3 terms; 10 for 5 terms; 15 for 6 terms; 3 for 7 terms; 11 for 8 terms; 7 for 9 terms; 13 for 10 terms.

Total number of trials and their results:
Number af convictions, ... 15
Number of acquittals, ... 13
Number of cases in which there was disagreement of jury, 4

Number of pleas of guilty,	28
Bonds forfeited:	
Number,	40
Amount,	$6,100
Number of *nolles* absolute,	65
Number of *nolles* upon terms,	16
Number of original informations,	not given.

Appealed cases and their disposition by verdict:
All cases in this court are appealed.

Whole number of prosecutions for different crimes,	not given.
Number of second convictions for the same crime,	"
Number of third convictions for the same crime,	"

WM. B. GLOVER,

Pros. Atty. Crim. Court of Common Pleas for Fairfield Co.

WINDHAM COUNTY.

To the Comptroller:

SIR:—Herewith I send you a statement of the business of this office for the year ending July 1, 1890:

Total number of cases disposed of during the year,	75

Number of terms they were in court—56 for 1 term; 12 for 2 terms; 5 for 3 terms; 1 for 4 terms; 1 for 5 terms.

Total number of trials and their results:	
Number of convictions,	6
Number of acquittals,	2
Number of cases in which there was disagreement of jury,	1
Number of pleas of guilty,	27
Bonds forfeited:	
Number,	10
Amount,	$1,300
Number of *nolles* absolute,	27
Number of *nolles* upon terms,	2
Number of original informations,	6
Appealed cases and their disposition by verdict:	
Number by verdict,	4
Number of pleas of guilty,	14
Number of *nolles* absolute,	18
Number disposed of upon payment or part payment of fine below and cost,	10

Whole number of prosecutions for different crimes, . .	75
Number of second convictions for the same crime, . .	none.
Number of third convictions for the same crime, . .	none.

JOHN J. PENROSE,

State's Attorney for Windham County.

LITCHFIELD COUNTY.

To the Comptroller:

SIR:—Herewith I send you a statement of the business of this office for the year ending July 1, 1890:

Total number of cases disposed of during the year, . .	114
Nuumber of terms they were in court—91 for 1 term; 20 for 2 terms; 1 for 3 terms; 1 for 5 terms; 1 for 7 terms.	
Total number of trials and their results:	
Number of convictions, ...	7
Number of acquittals, (on the sole ground of insanity) .	2
Number of cases in which there was disagreement of jury,	none.
Number of pleas of guilty, ...	27
Bonds forfeited:	
Number, ...	2
Amount, ...	$400
Number of *nolles* absolute, ...	58
Number of *nolles* upon terms, ...	18
Number of original informations, ...	44
Appealed cases and their disposition by verdict:	
Number by verdict, ...	2
Number of pleas of guilty, ...	1
Number of *nolles* absolute	9
Number disposed of upon payment or part payment of fine below and cost, ...	12
Whole number of prosecutions for different crimes, .	111
Number of second convictions for the same crime (for burglary,)	1
Number of third convictions for the same crime, .	not given.

JAS. HUNTINGTON,

State's Attorney for Litchfield County.

WOODBURY, August 22, 1890.

MIDDLESEX COUNTY.

To the Comptroller:

SIR:—Herewith I send you a statement of the business of this office for the year ending July 1, 1890:

Total number of cases disposed of during the year, . . . 63
Number of terms they were in court—49 for 1 term; 9 for 2 terms; 4 for 3 terms; 1 for 5 terms.

Total number of trials and their results:
Number of convictions, ... 4
Number of acquittals, ... 1
Number of cases in which there was disagreement of jury, none.
Number of pleas of guilty, ... 19

Bonds forfeited:
Number, ... 1
Amount, ... $50
Number of *nolles* absolute, ... 18
Number of *nolles* upon terms, ... 23
Number of original informations, ... 45

Appealed cases and their disposition by verdict:
Number by verdict, ... 1
Number of pleas of guilty, ... 1
Number of *nolles* absolute, ... 6
Number disposed of upon payment or part payment of fine below and cost, ... 15
Whole number of prosecutions for different crimes, . . 70
Number of second convictions for the same crime, . . none.
Number of third convictions for the same crime, . . . none.

WM. T. ELMER,

State's Attorney for Middlesex County.

TOLLAND COUNTY.

To the Comptroller:

SIR:—Herewith I send you a statement of the business of this office for the year ending July 1, 1890:

Total number of cases disposed of during the year, . . 34
Number of terms they were in court—29 for 1 term; 4 for 2 terms; 1 for 3 terms.

Total number of trials and their results:

Number of convictions,	3
Number of acquittals,	1
Number of cases in which there was disagreement of jury,	none.
Number of pleas of guilty,	11

Bonds forfeited:

Number,	1
Amount,	$200
Number of *nolles* absolute,	5
Number of *nolles* upon terms,	13
Number of original informations,	not given.

Appealed cases and their disposition by verdict:

Number by verdict,	1
Number of pleas of guilty,	1
Number of *nolles* absolute,	3
Number disposed of upon payment or part payment of fine below and cost,	7

Whole number of prosecutions for different crimes:

12 assault and battery.
5 burglary.
5 violation of liquor laws.
2 trespass on cultivated lands.
3 theft.
2 forgery.
2 breach of the peace.
1 cruelty to animals.
1 arson.
1 non-support of family.

Number of second convictions for the same crime,	not given.
Number of third convictions for the same crime,	not given.

BENEZET H. BILL,
State's Attorney for Tolland County.

ROCKVILLE, August 4, 1890.

SUMMARY.

The following is a summary of the statements of the attorneys for the several counties of the state, as shown by the foregoing returns:

Total number of cases disposed of during the year,	1,450
Number of terms they were in court—1,004 for 1 term; 250 for 2 terms; 63 for 3 terms; 30 for 4 terms; 26 for 5 terms; 16 for 6 terms; 7 for 7 terms; 17 for 8 terms; 10 for 9 terms; 20 for 10 terms; 3 for 11 terms; 2 for 12 terms; 1 for 14 terms; 1 for 18 terms.	
Total number of trials and their results:	
Number of convictions,	134
Number of acquittals,	45
Number of cases in which there was disagreement of jury,	19
Number of pleas of guilty,	418
Bonds forfeited:	
Number,	117
Amount,	$17,050
Number of *nolles* absolute,	458
Number of *nolles* upon terms,	251
Number of original informations,	323
Appealed cases and their disposition by verdict:	
Number by verdict,	49
Number of pleas of guilty,	86
Number of *nolles* absolute,	162
Number disposed of upon payment or part payment of fine below and cost,	150
Whole number of prosecutions for different crimes,	745
Number of second convictions for the same crime,	1
Number of third convictions for the same crime,	1

Thirty-Ninth Annual Report

OF THE

BOARD OF TRUSTEES

OF THE

Connecticut State Reform School,

AT

MERIDEN,

FOR THE FISCAL YEAR ENDING JUNE 30th, 1890.

TO

HIS EXCELLENCY, MORGAN G. BULKELEY,

Governor of the State of Connecticut.

MERIDEN:
REPUBLICAN BOOK DEPARTMENT.

1890.

TRUSTEES OF THE STATE REFORM SCHOOL.

HON. JOHN L. HOUSTON,	THOMPSONVILLE,	HARTFORD COUNTY.
TERM EXPIRES,	- - - - -	1893.
J. N. STATES,	NEW HAVEN,	NEW HAVEN COUNTY.
TERM EXPIRES,	- - - - -	1892.
JOHN K. BUTLER,	DARIEN,	FAIRFIELD COUNTY.
TERM EXPIRES,	- - - - -	1893.
ALBERTUS S. BRUCE.	POMFRET,	WINDHAM COUNTY.
TERM EXPIRES,	- - - - -	1893.
THEODORE BIRD,	BETHLEHEM,	LITCHFIELD COUNTY.
TERM EXPIRES,	- - - - -	1891.
CHARLES FITZGERALD,	MIDDLETOWN,	MIDDLESEX COUNTY.
TERM EXPIRES,	- - - - -	1891.
CHARLES F. SUMNER,	BOLTON,	TOLLAND COUNTY.
TERM EXPIRES,	- - - - -	1891.
J. S. LATHROP,	NORWICH,	NEW LONDON COUNTY.
TERM EXPIRES,	- - - - -	1891.

RESIDENT TRUSTEES.

COL. CHARLES L. UPHAM,	MERIDEN,	NEW HAVEN COUNTY.
TERM EXPIRES,	- - - - -	1891.
HON. ISAAC C. LEWIS,	MERIDEN,	NEW HAVEN COUNTY.
TERM EXPIRES,	- - - - -	1893.
HON. OWEN B. ARNOLD,	MERIDEN,	NEW HAVEN COUNTY.
TERM EXPIRES,	- - - - -	1891.
D. S. WILLIAMS,	MERIDEN,	NEW HAVEN COUNTY.
TERM EXPIRES,	- - - - -	1893.

OFFICERS OF THE BOARD OF TRUSTEES.

PRESIDENT.

HON. JOHN L. HOUSTON.

SECRETARY AND TREASURER.

COL. CHARLES L. UPHAM.

EXECUTIVE COMMITTEE.

CHARLES FITZGERALD, CHARLES F. SUMNER,
COL. CHARLES L. UPHAM.

AUDITING COMMITTEE.

J. S. LATHROP, HON. OWEN B. ARNOLD.

COMMITTEE ON DISCHARGES.

HON. ISAAC C. LEWIS, COL. CHARLES L. UPHAM,
HON. OWEN B. ARNOLD, GEORGE E. HOWE,
D. S. WILLIAMS.

COMMITTEE ON EDUCATION.

J. S. LATHROP, JAS. N. STATES.

SANITARY COMMITTEE.

DR. C. F. SUMNER, A. S. BRUCE.

MORAL AND RELIGIOUS TRAINING.

CHARLES FITZGERALD, THEODORE BIRD.

INDUSTRIAL TRAINING.

O. B. ARNOLD, JOHN K. BUTLER,
D. S. WILLIAMS.

OFFICERS OF THE SCHOOL.

SUPERINTENDENT,
GEORGE E. HOWE.

MATRON,
MRS. F. M. HOWE.

BOOK-KEEPER,
G. WORTH HOWE.

TEACHERS IN THE CONGREGATE DEPARTMENT,
MISS ELLA PURDY, MISS CARRIE BURDICK,
MRS. S. B. LOCKWOOD.

SUPERVISOR OF SOUTH DIVISION,
THOMAS McGUIRE.

SUPERVISOR OF NORTH DIVISION,
W. F. FRANCIS.

FARMER,
C. L. PHINNEY.

NIGHT WATCHMAN,
ISSACHER CURRIER.

COTTAGE A,
SUPERVISOR—JOHN GALLAGHER.
MATRON—MRS. JOHN GALLAGHER.
TEACHER—MRS. M. F. DAYTON.

COTTAGE B,
SUPERVISOR—J. A. SMITH.
MATRON—MRS. J. A. SMITH.
TEACHER—MISS C. G. HALL.

COTTACE C,
SUPERVISOR—JOHN PARISH.
MATRON—MISS MARY I. RAND.
TEACHER—MRS. JOHN PARISH.

COTTAGE D,
SUPERVISOR—F. P. OWEN.
MATRON—MRS. F. P. OWEN.
TEACHER—MISS A. OWEN.

COTTAGE E,
SUPERVISOR—C. S. FOX.
MATRON—MISS C. GREEN.
TEACHER—MISS SUSIE COWDERY.

State of Connecticut.

REPORT OF THE TRUSTEES

OF

CONNECTICUT STATE REFORM SCHOOL.

To His Excellency, MORGAN G. BULKELEY, *Governor of the State of Connecticut:*

SIR:—In compliance with the law, we herewith present the thirty-ninth Annual Report of the Connecticut State Reform School.

The whole number of boys received into the School since it was established is 4,738.

The number remaining in the School June 30, 1889, was	458.
The number received during the last year was -	156.
The number returned from probation was -	40.
And the number discharged during the year was -	223.
Leaving in the School June 30, 1890, -	431.

The change from the congregate to the cottage system, which has been effected within the last ten years, has greatly improved the condition of the School, and relieved the original building from its over crowded condition. The five cottages, now completed and occupied, afford excellent accommodations for two hundred and fifty of the inmates of the school, and as each cottage is a separate family, with

its own Supervisor, Matron and Teachers, the gradation of the School is greatly improved.

The School, under the efficient management of Mr. and Mrs. Howe, has become the model one of its kind in the country.

The Chapel, erected some ten years since, is occupied on Sundays by clergymen of different denominations and by Sunday-school, and has become an important factor in the moral and religious training of the boys.

For a statement of the condition of the School and for suggestions for your consideration, we respectfully refer you to the accompanying report of the Superintendent.

The past year has been one of marked and healthful progress in the School, and it is hoped that with Executive and Legislative favor in the future, and with the blessing of Divine Providence, the School may continue to deserve and receive liberal support.

JOHN L. HOUSTON,
O. B. ARNOLD,
A. S. BRUCE,
JNO. K. BUTLER,
J. S. LATHROP,
ISAAC C. LEWIS,
JAS. N. STATES,
CHAS. F. SUMNER,
D. S. WILLIAMS,
C. L. UPHAM.

MERIDEN, CONN., October 9, 1890.

Sworn to before me, O. B. ARNOLD, *Notary Public.*

SUPERINTENDENT'S REPORT.

To the Board of Trustees of the State Reform School:

GENTLEMEN:—In conformity with law, I herewith submit my Annual Report for the year ending June 30, 1890.

It is now a little more than twelve years since I assumed the important supervisory trust of the Connecticut State Reform School, an Institution over which your guardian care has been extended with such marked interest and ability. It may be of interest at this time to present a few facts concerning the condition of the Institution twelve years since, and the progress that has been made in the School from that, to the present time. At the time we took charge of the Institution it was emphatically a *prison* for boys, and was so regarded over the entire State, being frequently stigmatized as the "Penitentiary for Boys." Very little freedom was manifest in any department of the School, and the principal effort and ambition of the delinquent, was to secure freedom by breaking away from appliances that were unnatural and hateful to his nobler impulses. The constant surveilance of those in charge, rendered necessary on account of the unnatural restraints to boy life, made from one standpoint, a poor condition or outlook from which to expect a growth of natural self respect and development, such as would lead the boy to the light of intelligence and a desire for a better life. Boys were sentenced by the Courts for a definite period, and no matter how bad the conduct of the boy might be, he was discharge at the expiration of his term, and the Board of Trustees had no further guardianship over him, till again returned to the School under sentence

by some Court of the State, a result of no uncommon occurrence, and there was quite a strong sentiment throughout the State, that but little was accomplished in the way of reform, among the inmates of the School. Some of the Courts of the State would sentence boys for a limited period to the jails, in preference to entrusting them to the care of the Reform School.

The general dilapidation and thread-bare condition of the Institution in every department was such as to make it an unpleasant home for either teacher or inmate. The appliances for heating the School were such, that in the severe weather of winter, the temperature of the school rooms even, would be so low, that plants would freeze if left in them, a poor condition for health and comfort. The dining room for the boys was in a low, poorly ventilated basement room, and the tables were very poorly spread. The washing was all done by hand in one small room by a class of large boys, an employment they never enjoyed. In fact there was a lack of comfort and convenience in every department of the Institution. With all of these unfavorable conditions we entered the school as its Superintendent. The first year having no State appropriations with which to make improvements, but little could be done to better the situation, so far as the comforts of the buildings were concerned. The first important change made, was to convert the room used for chapel purposes, into a comfortable dining room. This room was supplied with tables that would accommodate twelve boys each. The tables were covered with white oil cloth, furnished with white porcelain ware, silver plated knives, forks, spoons and casters, and chairs were furnished for the boys to sit on. The contrast between this room and the one vacated, where the boys sat upon a stool fastened to the floor, at a bare table twenty inches wide, spread with dishes, knives and forks unworthy of a place upon a table spread for human beings, was very great indeed. We ate our first dinner in this new dining room on the Fourth day of July, and never did boys enjoy Independence Day more than did the Reform School boys on that day. The boys of the Institution were held so firmly that their principal study was to contrive some method by which they might escape, all bolts, bars and locks had to be examined daily, to early detect any efforts at removal by the aid of file or saw.

Well do we remember the first time the doors were swung open from the front to the rear of the building. Three boys coming down

from the shops, seeing this, their first opportunity to escape, bareheaded and barefooted, flew out through the front door at a wonderful rate of speed. Fortunately help was at hand and they were easily captured. Not having been accustomed to open doors, the temptation to break for freedom was too great to be resisted.

The year previous to our coming to the Institution, thirty boys on "circus day," broke through the yard fence and escaped. This made lively work for the policemen of Meriden and the surrounding cities. This year we notified the boys that we should take them all to see the "Barnum show" when it came along. They did not think it possible that the management could, or would extend to them such a favor, but the promise was kept and they all went to the show. Policemen came from other cities, as they said, "to see the fun," but not a boy attempted to escape, no boys could have behaved better, and on their return to the School, called the Superintendent to the yard, where they gave him three cheers for his kindness to them. From that time to the present, boys have been safely trusted to go to all parts of the city on Institution business, unattended, and in no instance, when so trusted, has the confidence been betrayed. Nothing pleases a boy more than to feel he is worthy of trust.

At the first session of the Legislature after we assumed the supervision of the School, we procured a change in the law, from definite sentences to indefinite; or during minority.

The boys under the new law, grade out of the School on good behavior. As the rule now is, a boy by uniform good conduct can leave the school on probation, at the end of eleven months after entering the Institution, but any boy can be called back to the School without process of law, if his conduct is such, after leaving it, as to make him an unprofitable member of society. The enactment of this law did much for the reformatory element of the School, as no boy is now allowed to pass from the School till by his good behavior he gives evidence of reformation.

In our first Annual Report to the board we advocated the family or cottage system for adoption, but did not ask for an appropriation with which to build cottages, but in our second Report, recommended that an appropriation be asked for, for one cottage and a chapel building, which was granted, and, during the summer of 1880, these buildings were erected, and on the 13th day of April, 1881, the new

chapel was dedicated, and on the 24th of May, 50 boys were transferred from the congregate department to the new cottage.

THE COTTAGE SYSTEM

is now the only system thought of, wherever reformatories are being established by the different States, and those still in existence on the antiquated congregate plan are being remodeled as far as is practicable from the big house system to that of the cottage plan of management.

When we first advocated the change for the Connecticut Reform School, we had no doubt of its practicability or superiority for reformatory purposes, for we had seen the workings of both systems and knew from personal experience that the herding together, under one roof, in common contact, of little wayward boys and those advanced in all degrees of crime, had a most injurious effect upon those of tender ages, who needed only proper associations and good example to make them good boys in the best sense. The influence for good, in the separation of these boys into separate classes or families, has been entirely satisfactory.

In consequence of the lack of public confidence in the school when we took charge of it, we, from necessity, had to advance slowly, as many of the best citizens of Connecticut looked upon the change as a dangerous and expensive experiment or innovation. But the confidence and co-operation of the Board of Trustees, together with the intelligence of successive General Assemblies, secured for the school the erection of five cottages, for beauty and adaptation unsurpassed in any part of the country. Each cottage provides amply for fifty boys, and each is supervised by a gentleman and wife and one teacher, all of whom are experienced in reformatory work. Each family is an Institution by itself, being independent of all others, living merely as neighbors, subject only to the general regulations governing all of the families.

Had not these cottages been erected, the main building would not have accommodated the constantly increasing number of boys sent to the School after the confidence of the courts had been secured.

It is with pardonable pride and pleasure that we recall the visits of Trustees, Directors and other officials of reformatories, from many other states, and their enthusiastic approval of the Connecticut Reform School and its methods, as it exists at the present time.

They have returned to their respective States, ready to adopt our

plans and methods, and have made official record in their reports, of the efficiency of the Connecticut Reformatory. This, of course, is gratifying to us, as it must be to the Board of Trustees and every interested citizen of our commonwealth.

California has recently provided for the erection of two Reformatories in different parts of the State, both of which sent a committee to us to learn of our methods, and we were honored by being called upon to furnish plans for both Institutions, which we did. It is true Connecticut is not as large in territory or population as many of the States, but she is large in philanthropy, good citizenship, and the efficiency of her institutions.

The watchful care and interest of the several legislatures since we came to the School has been such, as to enable us with the co-operation of the Board, to make many valuable advances in reformatory treatment, and to make the School worthy of high consideration. We have been patiently listened to, and our needs and wants have been cheerfully granted from session to session. It has been distasteful to us to appear at every session asking for aid, but duty to the State and its wards, made it necessary to present its needs from time to time. This was done, leaving the result with the General Assembly, which in every instance has seen the necessity of our requests, and granted them, a confidence we truly appreciate, and one which we will endeavor to merit, by giving our best thoughts and care to the wayward boys of the State, with the hope that a large percentage of those sent us, may be returned to the communities from whence they came, as reformed boys, prepared to act their part well as good citizens.

To accomplish our highest ambition, and to add what we consider will be the crowning feature of the Connecticut Reformatory, we wish one more cottage, built as a *double-cottage*, separate and apart from the other buildings, at least one-third of a mile, to accommodate from seventy-five to a hundred boys of tender age, truants who are unmanageable at home, but not adepts in crime, and who should never come within the influence of more hardened boys. Many boys are sent to us for no particular offence, homeless perhaps, or what is worse, from neglected homes, with no good home influence, example or restraint. These boys absent themselves from school, become idlers, frequent improper places of resort, and, unless checked, will develop into criminals. Many such are sent us, and for lack of

special accommodations for them, we are hampered somewhat, and are in constant fear that all efforts to shape their youthful minds, may be neutralized by contact with more hardened boys.

With a separate building for this class, the danger would be obviated and the most desirable feature of our family system would be reached. This is no new idea with us, neither is it an experiment. Our last and most prideful act at the Ohio Reform School, just before coming to the Connecticut Institution, about thirteen years since, was the erection of such a cottage for that Institution, the necessity for which had been apparent for many years. The beneficial results accruing from the erection and occupancy of this cottage, to the Ohio Institution, can not be estimated on a money basis, and that great State ever vigilant in the cause of making good citizens and in reducing crime to a minimum, gives testimony to this distinct feature of its reformatory as its crowning glory.

In the interest of this class of unfortunates, sent to us for care, protection and reform, may we not ask the Board of Trustees to present the necessity for this building to the incoming General Assembly.

What Ohio has, and receives so much benefit from, Connecticut *may* have. We have a most beautiful location in a grove about one hundred rods from the main building on a high elevation, which is particularly well adapted for this building.

With an unbroken experience of over thirty years in reformatory work, we do not hesitate to say, that no more powerful factor for the benefit of the Institution and the State could be provided, than the introduction of this new feature. The expense of building such a cottage need not exceed $25,000. Knowing as we do of the benefits that would result from the improved classification we would be able to make in the School by the aid of this additional building, we feel it our duty to bring the matter before the Board of Trustees, with the hope of approval such as will bring it before the Legislature and the people of the State whose sympathies and financial aid in the past, has assured us of the desire and willingness on their part to do whatever seems best to promote or advance the facilities necessary in the interests of our unfortunate boys. With this additional building, Connecticut would stand in the lead for appliances with which to do good reformatory work.

EXPENSES.

It is a well known fact to most, if not all the members of the Board,

that our constant aim and care has been at all times to exercise a rigid economy, and to keep expenses low, avoiding however, that parsimony that would involve the running down of the State's property. Economy has been a necessity, for the appropriations have not always been equal to the requirements for repairs, fire protection and unforeseen casualties.

It is well known that the Institution, when we assumed charge, was in a very dilapidated condition. One of the papers of the State characterized it as the "Old Hulk upon the Hill." The building has been restored in a manner to give it a pleasing appearance, and we consider it now almost as good as new, but it has cost money to put it in this condition. All the property of the Institution has been kept in good repair, knowing it to be poor policy to let State property run down or suffer for want of timely attention. For want of means, there have been times when we could not do what the best interests of the School seemed to call for. The repairs of a large Institution, where there are so many buildings as we have, are always a large item of expense, and there is certainly no economy in allowing buildings to suffer for want of timely repairs.

We have reasons for a high degree of satisfaction for the improved condition of all the buildings connected with the School. The main building that formerly was heated by stoves, a constant fire menace to the lives of the inmates and the property of the State, is now heated by steam. Stand pipes and fire hose are located at all necessary points throughout the buildings, and hydrants are placed in the yards, so that we are well protected against fires. The once narrow hall-ways and stair-cases have been changed so as to lessen the danger from accident or panic.

The exterior of the building has been modernized from time to time, and so improved as to no longer deserve the title of "the hulk on the hill."

The laundry work that was once done by hand, is now done by improved machinery, giving better results, with no humiliation on the part of the boys, who as a rule dislike laundry work.

These are only a few of the many improvements made without large special appropriations, and it has only been accomplished by exercising the strictest economy.

CARE OF THE BOYS.

In our effort to properly care for the boys, and at the same time

exercise economy, we have been careful to have the food and clothing satisfactory to them, for we firmly believe that if boys are to be reformed, they must feel that they are well cared for. Our inflexible rule is, that there shall always be an abundance of clean, wholesome food, to satisfy the wants of all, and that the clothing shall be comfortable and suitable to the season. In doing this, it is a problem sometimes difficult to solve, to know how all of the expenses of the Institution are to be met, by the meagre sum of $2.50 per week for each boy. The matter of clothing alone is a large item of expense, when a new boy enters the School, he is supplied with two suits, a working and a Sunday suit, at a cost of $12. If released at the end of the year on "Honor," he is furnished with a citizen's suit at a cost of ten dollars more. This leaves but little over two dollars per week to feed and educate him, as well as to pay salaries, for fuel and lights, and all other expenses connected with the Institution.

If we had an increase of twenty-five cents per week in the allowance for board, we would be able to work to much better advantage and the State would be the gainer, as this slight increase would insure us against caprice in legislation, and enable us to keep up the repairs on buildings without going to the Legislature every session for appropriations, which is always distasteful to us.

The Industrial School for Girls, with its numerous public bequests (of which we have none), receives $2.75 per week; and experience tells us that it costs more to maintain boys than girls. As a rule, they are heartier eaters, and more severe on clothing. It might be well to call the attention of the Legislature to *this* subject.

DISCIPLINE OF THE SCHOOL.

The discipline and *Morale* of the Institution, is a matter for the most hearty congratulation. The willing obedience of the boys to the rules of the Institution, and the instructions of their teachers and other officers of the School, often brightens the dark side of reformatory work. No School we think can claim a better or more natural discipline, the result of the law of kindness administered with judicious firmness.

The discipline is made easy to a great extent, on account of the uniform harmony existing among the officers and teachers, all of whom, seem interested in their work, and feel individual responsibility in the true development of those under their charge. The boys themselves have given the School the reputation through their

visiting friends, of being a home, where the desire is to *reform*, and not to punish. Every boy in the School understands and appreciates this, and each, as a rule, is desirous of excelling the other in good behavior. The Reform School boy of to-day, knows he has friends solicitous for his future welfare, and as a result, he makes an honest effort to become better. He rarely betrays the confidence placed in him, although allowed the greatest freedom possible. If a boy foolishly makes up his mind to escape, he is very likely to return within a few days, in which case he does not lose his standing in the School, receiving no punishment whatever. Severe punishments are antagonistic to human nature, and discipline born of fear of such punishment, is not sincere or permanent. The teacher who shows a desire to be kind and obliging to his pupil, will generally find a willing response on the part of the subject to be governed. Human nature is not unlike, the world over. The rule that applies to well governed families, or to the public Schools, will apply equally well to the boys of a Reform School.

Our teachers fully appreciate this, and co-operate with the management to the fullest extent in convincing the boys of the School that the law by which they should be governed properly and correctly, is the law of kindness. In our first years at the Institution, we found as the result of the spirit of insubordination that seemed to rule supreme in the School, that many well-meaning people of the State believed the boys to be hopelessly criminal, subjects fit only for confinement, that society might be protected. The boys themselves very soon caught this idea, and came to believe they were friendless outcasts, unworthy of kind care or treatment It is true that many boys have been sent to the School who were hardened criminals, being sent through the leniency of the court, that should have been sent to prison. Of course, the per cent. of reform with this class of subjects would not be large, but we can state with accuracy, that of those sent to us, a very large majority have been benefitted in such a degree as to make them profitable members of society.

We have labored faithfully to create a public sentiment in the State that it is better to *reform* a boy than punish him, and believe we have been successful to a large degree. The people of the State who visit the School, show a decided change in feeling, as compared with former years, they look upon the boys as unfortunates rather than as criminals beyond the reach of reform, and have spoken kind and en-

couraging words to them. This has been an excellent factor in our discipline, for the boys are quick to discern interest in, and friendship for them. The Legislative visits to the School have also been a power for good to the boys. The plain talks by the leading men and law-makers of the State, give evidence of the great interest taken in them for their benefit.

INDUSTRIES.

The industries of the School have undergone no great change during the year. We still continue the cane seating, which brings to the Institution some revenue, and at the same time furnishes employment to a class of small boys, for whom it would be difficult to find employment at anything else. Our tailor shop employs fifteen to twenty boys in manufacturing and mending the clothes worn by the boys. Our shoes are all made and mended by a class in the shoe shop. The work in the laundry, kitchen, dining-rooms, sleeping halls, etc., is all done by the boys under proper supervision. Large classes are employed on the farm and in the garden. We would be pleased if the State could, in its wisdom, appropriate the necessary funds for the introduction of trade teaching, on a wider scale than our present means permit. It is difficult to decide just where the duty of the State to these boys should end. Of course the introduction of trade teaching would be attended with cost, but the boys receiving the benefit would leave the School better prepared to be self-sustaining.

We must remember that the main object of the State Reform School, is to reform the boys sent to it. When this is done, and the boys are given a good common school education, together with the opportunities afforded to learn to be industrious, they have as a rule, as fair a start for success in life as the boys of the average private families of the State. The management will be pleased to carry out any advance step the Legislature may take in the direction of introducing trade teaching to the State Reform School. We copy the following from our Thirty-seventh Annual Report.

"*Industrial Training Department.* This is a much needed department, the necessity for which grows more apparent every day—a department that would add efficiency to our Reformatory education, and do much towards dispelling bad citizenship—the bane and curse of every State. All agree that one of the missions, if not the chief mission, of a Reformatory, is to teach industry; where

industry takes the place of idleness, the mind is so occupied that there is but little time for vicious thoughts and actions. Our boys must be impressed with the great and wholesome truth, that it is manly to labor, manly to be self-sustaining, manly to be producers and not dependents. This principle cannot be fully taught or demonstrated without the means, diversified means, and opportunities to make them skilled workmen while in the Institution. This would enable the discharged boy to take his place in the workshop with skilled mechanics at good living wages. Our present facilities afford no such opportunities. If we except agricultural pursuits, few boys who leave the Institution follow the labor they were taught at the School. The reason for this is manifest when we state that our principal industry is that of cane seating chairs, and this is not a trade by which any considerable number of boys can earn a living after leaving the School.

Had we been able to introduce trade-teaching in the past, it would have been a blessing to the discharged boys, by lifting them to the proper type of manhood, by reason of the consciousness of their ability to care properly for themselves, and not to be a burden upon society.

It is true that trade-teaching can not easily be made remunerative from a dollar and cent standpoint, but the outlay is money well invested when we look to the future of the discharged boy. The Institution at Rochester, N. Y., has already expended about $25,000 in the establishment of shops for teaching the different trades, and many other Institutions have made a start in the same direction.

From the fact that success has attended technological training in other States, I am confident the co-operation and endorsement of our Legislature can be easily secured in the establishment of a Trade-teaching Department for our own School.

Thus far we have given as many boys as possible a knowledge of agricultural labor, believing this department of labor to be very efficient in our reformatory work. We have also sought employment that would produce an income, this being made necessary by the state of our finances. While we have not thus far been able to teach the boys useful trades, we have neglected no opportunity to teach them the importance of industry."

AN INSTITUTION PAPER.

The matter of publishing a paper in the School has been under

consideration for some time. The experiment has been tried in many of the Institutions of the country with success, and there is no reason why we may not do as well as others in an enterprise of this kind It will not involve a great expense, and from ten to fifteen boys can be employed at a time in learning a trade that will demand fair wages after they leave the School. The experiment will be tried as soon as suitable arrangements can be made.

THE FARM AND GARDEN.

The farm and garden supply the tables of the Institution with all the vegetables needed. It gives healthful employment to a large class of boys, who from the instructions they receive, may become practical farmers and gardeners if they desire to follow the vocation after leaving us. The work on the farm contributes materially to the health and physical condition of the boys employed.

The present season we have divided the garden into seven divisions, containing about an acre and a half each. Each Cottage Manager takes one division for his portion, having a certain class of vegetables to produce. The yard Supervisors do the same. This gives an opportunity for each division to take out a class of boys daily, and in the course of the week, all the boys of the School have had an opportunity of working a portion of their time in the garden, a privilege they very much enjoy. The good results of this arrangement can already be seen, not only in the amount of vegetables produced, but in the neat and tidy manner in which the work is done, there being a friendly rivalry and desire with each class to excel the others.

SCHOOLS.

The Schools have been conducted as heretofore, each boy receiving about three hours of instruction daily. Many of these boys come to us not knowing even the alphabet, but as a rule leave us with a fair knowledge of the common branches of education. Special efforts are made to teach each boy reading, writing, spelling, and so much of arithmetic and book-keeping as will enable him to transact business correctly.

LIBRARY.

The Library is well supplied with interesting books, that are attractive to the boys as well as instructive. No books of a sensational character are allowed in the library, but we have made an effort to select those not so intricate as to be thrown aside by the boys because

they could not be understood. We shall need our usual annual appropriation of $500 to keep the library up to its present state of excellence.

RELIGIOUS SERVICES.

Two services are held in the chapel each Sabbath: Sabbath school in the morning and preaching in the afternoon, at which clergymen from the city churches officiate in turn.

The religious interests of the Catholic boys are looked after by clergymen of that denomination and the Sisters of Mercy. The citizens of the city attend our services as far as our accommodations will permit.

SANITARY CONDITION.

The sanitary condition of the School has never been better than during the past year. There have been no deaths except from hereditary consumption, and this has been confined entirely to the colored boys. As a rule, the health of the boy improves after entering the School, and he leaves it stronger mentally and physically than when he entered it.

Systematic living, regular hours for meals, sleep, recreation, etc., all conduce to health. Our facilities for bathing are excellent, and the boys are required to bathe as often as prudence demands. Much stress is laid upon cleanliness, not only with the boys, but in every department of the Institution.

During the prevalence of the grippe last winter, through the care and the vigilance exercised, the Institution was exempt from its ravages.

The small pox was also epidemic in the city for about two months, the last case being extirpated in April. There were several cases on streets very near to the Institution, but we maintained a vigorous quarantine at the School, allowing no boys to go off the grounds, and persons not belonging to the School, were not allowed to enter except in unavoidable cases. By strict precautionary measures, the scourge was kept from the School.

ENTERTAINMENTS.

Since the erection of the new Chapel, we have been able to give a series of entertainments each winter, that have been very enjoyable and profitable to the boys, and have given character to the School. They have been given once in two weeks and consisted of Operettas, Orations, Recitations, Dialogues, Tableaux, etc. The entertain-

ments have acquired such a reputation that the citizens who first attended them perhaps to encourage the boys by their presence, now come for an evening of pleasant enjoyment, and the popular verdict is, that the entertainments would do credit to professionals. They have become a part of our educational system, and exert an elevating influence over the School.

THE BRASS BAND.

The Institution has its own brass band, the instruments being the gift of two wealthy citizens of Meriden, one of whom is a member of the Board of Trustees. On pleasant evenings the band gives open air concerts from the band-stand on the lawn, which are highly enjoyed, not only by the boys, but by the citizens surrounding the Institution. Such boys are selected as have a taste for band music, and their playing reaches so high a standard of excellence, that their services are sought for by civic organizations, and by the State Fair annually, for which the Institution receives a compensation. Boys receiving this musical education, are able to find employment readily in the Government service, also in factories that maintain an instrumental organization.

CONCLUSION.

Much of the matter referred to in this report has been discussed in past reports, but as different gentlemen constitute the Legislature at every session, we deemed it prudent at the close of our twelve years connection with the Institution, to give a *resume* of the work accomplished, even if it took more space than we usually devote to these reports.

Our work has been somewhat embarrassed on account of the want of confidence in the Institution at the time we assumed its supervision, but this we believe has been overcome, and to-day we trust the School is fulfilling its mission.

In all other reformatories as well as our own, one bad boy who fails of reform, attracts more attention than the ninety and nine who go not astray, and the stigma of notoriety given by the *one* delinquent, is not offset by the correct life pursued by all the others. We are forced by law to take boys of all conditions, and the record upon which they are committed, is not always in accordance with the facts.

Through local influences or friendships, boys are frequently sent to us as truants merely, when they are guilty of grave offenses. We

cannot change the official record, although we may have information of the real character of the boy.

We have sent to us also boys of physical impairment and mental weaknesses, who should be in a hospital, or under medical care. Many States, knowing that the admission, of such boys, interferes with reformatory work, exclude them from their Reformatories, and send them to suitable asylums. It would be well if we had authority in Connecticut to exclude all boys not proper subjects for reformatory treatment.

A distinguishing feature of our School, and one worthy of consideration and approval, is the fact that boys who leave the Institution to battle with life and its realities, may return, if unsuccessful in their efforts, for a temporary home, till they may be further and properly provided for. The feeling with the boy that he has a home to come to, where he will be made welcome, till there are other opportunities for him, does much to prevent his yielding to temptations with which he is liable to be surrounded. Many a boy has been saved from falling, by this humane provision of our School

Another pleasant feature of our Institution is, that partisan politics, the bane of any philanthropic Institution, has never been known in our Connecticut Reform School.

When politics enter an Institution, the matter of reform is entirely lost sight of, and it becomes merely a place for those who have done party service, without any reference to their adaptability to the work they are expected to perform. No Institution can stand the strain of party politics, where its places of trust are filled by persons of inadequacy or mediocrity.

In the face of any and all discouragements with which we meet, we feel that the Institution is doing a good work, and is entitled to generous support, such as it has received in the past. We are anxious to bring it to a high standard of efficiency, and to have it truly fulfill the mission for which it was established. We realize fully that the more boys we can send out who will act their part well in life, the larger will be the mantle of protection we throw around society.

Commending the Institution to Divine favor, for whose blessings and bounties we are grateful, and with the hope our stewardship has been such as to merit the approval of the Board of Trustees and the citizens of the State generally, this report is

Respectfully submitted,

GEO. E. HOWE, *Supt.*

EXHIBIT No. 1.

CLASSIFIED STATEMENT OF EXPENDITURES AND RECEIPTS OF THE CONNECTICUT STATE REFORM SCHOOL, FOR THE YEAR ENDING JUNE 30, 1890.

EXPENDITURES.		*RECIPTS.*	
For Farm,	$ 1,037.55	From Farm,	$ 246.20
Miscellaneous,	362.68	State Treasurer,	62,162.60
Chapel,	102.00	Miscellaneous,	34.33
Traveling,	264.42	Boarders,	292,00
Postage,	88.81	Freight,	41.00
Freight,	314.78	Green House,	92.80
Returning Escapes,	15.20	Chair Shop,	9,236.78
Telephone and Telegraphing,	65.78		$72,105.71
Hospital,	714.32		
Salaries,	19,428.00		
Heating and Lights,	1,0469.35		
Stable,	1,717.55		
Repairs,	4,939.30		
House Furnishing,	744.84		
Clothing,	5,283.29		
Shoe Shop,	1,241.65		
Library,	485.39		
Laundry,	208.01		
Green House,	27.81		
Stationery,	108.72		
Water Rent,	933.54		
Chair Shop,	8.85		
Provisions,	16,807.72		
Deficit of 1889,	503.54		
Cash on hand,	6,232.61		
	$72,105.71		

MERIDEN, CONN., Sept. 16, 1890.

This will certify that we have examined the accounts of George E. Howe, Esq., Supt. of the State Reform School, for the fiscal year ending June 30th, 1890, compared the vouchers therewith, and find the same correct, showing a balance of cash in the hands of the Superintendent amounting to twelve hundred and twenty-four dollars and thirty-two cents ($12,24.32), and a balance in the hands of the Treasurer of said Reform School amounting to five thousand and eight dollars and thirty cents ($5,008.30).

FRANK L. RODGERS, } *Auditors of*
W. CECIL DURAND, } *Public Accounts.*

EXHIBIT No. 2.

SHOWING THE WHOLE NUMBER OF BOYS THAT HAVE BEEN INMATES OF THE SCHOOL SINCE ITS OPENING IN MARCH, 1854.

Whole number since opening		4738
Number in School July 1, 1889,	458	
From Hartford County,	32	
New Haven County,	52	
Fairfield, "	39	
New London, "	12	
Middlesex, "	1	
Tolland, "	5	
Windham, "	4	
Litchfield, "	9	
Boarders,	2	
Number received on old Commitment,	13	
Number returned themselves,	27–196	
Total,	654	
Discharged in various ways,	223	
Number remaining in School July 1, 1890,	431	

EXHIBIT No. 3.

SHOWING THE AGE OF BOYS AT COMMITMENT.

AGE.	PAST YEAR.	PREVIOUSLY.	TOTAL.
Six,	0	8	8
Seven,	0	31	31
Eight,	0	70	70
Nine,	7	154	161
Ten,	8	477	485
Eleven,	12	528	540
Twelve,	18	700	718
Thirteen,	36	716	752
Fourteen,	26	820	846
Fifteen,	21	810	831
Sixteen,	23	222	245
Seventeen,	4	27	31
Eighteen,	1	14	15
Nineteen,	0	4	4
Twenty,	0	1	1
Total,	156	4582	4738

EXHIBIT No. 4.

SHOWING FOR WHAT OFFENCE COMMITTED.

	PAST YEAR.	PREVIOUSLY.	TOTAL.
Theft,	41	2069	2110
Burglary,	13	206	219
Vagrancy,	12	280	292
Truancy,	6	658	664
Stubborness,	0	51	51
Obtaining goods on false pretenses,	0	21	21
Arson,	1	34	35
Cruelty to Animals,	0	5	5
Sabbath Breaking,	0	1	1
Malicious Mischief,	2	56	58
Assault,	3	128	131
Assault and Battery,	2	53	55
Breach of the Peace,	4	52	56
Horse Stealing,	0	16	16
Disorderly Conduct,	0	13	13
Robbery,	1	4	5
Trespass,	1	17	18
Manslaughter,	0	1	1
Forgers,	0	4	4
Driving horses without permission,	1	33	34
Lacivious Carriage,	1	2	3
Profane Cursing,	0	4	4
Getting on Cars,	0	3	3
Abusive Language,	0	3	3
Common Drunkard,	0	14	14
Misdemeanor,	0	8	8
Fornication,	0	1	1
Breaking Windows,	0	10	10
Attempt to Kill,	0	1	1
Attempt to Commit Rape,	0	9	9
Rape,	0	3	3
Disobedience,	0	17	17
Placing Obstructions on Railroads,	0	4	4
Receiving Stolen Goods,	0	1	1
Intoxication,	0	12	12
Boarders,	2	163	165
Incorrigibility,	66	625	691
Total,	156	4582	4738

EXHIBIT No. 5.

SHOWING BY WHAT AUTHORITY COMMITTED.

	PAST YEAR.	PREVIOUSLY.	TOTAL.
Hartford Superior Court,	0	39	39
New Haven "	0	73	73
Fairfield "	0	66	66
Litchfield "	0	27	27
Middlesex "	0	10	10
Tolland "	0	15	15
New London "	1	15	16
Windham "	0	7	7
New Haven Common Pleas Court,	0	1	1
Hartford Police Court,	8	573	581
New London "	1	84	85
Norwich "	5	129	134
Waterbury "	8	177	185
New Britain "	3	146	149
Bridgeport "	20	266	286
Meriden "	5	169	174
Stamford "	2	17	19
New Haven "	25	759	784
Norwalk "	0	3	3
Middletown "	0	36	36
Danbury "	1	18	19
Derby "	0	11	11
Wallingford "	0	5	5
Stafford "	0	2	2
Greenwich "	2	0	2
Ansonia "	1	0	1
Bethany Probate Court,	0	1	1
Justice Court, Various Towns,	72	1770	1842
Boarders	2	163	165
Total,	156	4582	4738

EXHIBIT No. 6.

SHOWING THE VARIOUS WAYS BY WHICH THE BOYS HAVE LEFT THE INSTITUTION.

	PAST YEAR.	PREVIOUSLY.	TOTAL.
Placed with Farmers,	13	478	491
Placed at Various Trades,	2	47	49

	PAST YEAR.	PREVIOUSLY.	TOTAL.
Sentence Expired,	0	941	941
Returned to Parents and Friends,	195	2613	2808
Sent to Deaf and Dumb Asylum,	0	1	1
Sent to Hospital,	1	5	6
Returned to Providence Reform School,	1	4	5
Discharged to go to Sea,	0	6	6
Discharged to Enlist in the Army,	0	26	26
Discharged to Selectmen,	0	1	1
Discharged for Defective Mittimus,	1	22	23
Discharged by Order of Court,	0	16	16
Discharged by Legislature,	0	3	3
Remanded to Alternate Sentence,	0	33	33
Released to be Tried for Incendiarism,	0	2	2
Escaped and not yet Returned,	5	156	161
Died,	2	69	71
Boarders Dismissed,	3	155	158
Released to be Tried for Assault,	0	2	2
Released to be Tried for Burglary,	0	2	2
Sent to Children's Home,	0	3	3
Total,	223	4585	4808

EXHIBIT No. 7.

SHOWING BIRTHPLACE OF THOSE COMMITTED.

Connecticut,	120
New York,	8
Massachusetts,	8
Rhode Island,	1
New Hampshire,	1
Maryland,	1
Ireland,	3
Germany,	1
Italy,	3
England,	3
Scotland,	1
Novia Scotia,	1
Unknown,	5
Total,	156

EXHIBIT No. 8

PERENTAGE OF THOSE COMMITTED.

American,	52
Irish,	61
German,	17
French,	4
English,	3
Scotch,	2
Italian,	3
Colored,	14
Total,	156

FARMER'S REPORT.

To the Superintendent of the State Reform School:

SIR :—The following tables show the amount of all farm products for the year ending June 30, 1890: also the amount of same on hand and the inventory of stock and tools on the farm,

All of which is respectfully submitted,

C. L. PHINNEY, *Farmer.*

FARM PRODUCE.

65	Tons of	English hay,	$1300 00
12	"	Clover hay,	180 00
6	"	Hayed Oats,	60 00
4	"	Bedding,	40 00
3	"	Rye Straw,	42 00
45	Bushels of	Rye,	31 50
925	"	Potatoes,	691 75
235	"	Cattle Beets,	117 50
25	"	Turnips,	12 50
19	"	Early Turnips,	7 60
90	"	Table Beets,	54 00
105	"	Carrots,	52 50
205	"	Onions,	164 00
48	"	String Beans,	28 80
24	"	Lima Beans,	19 20
135	"	Peas,	148 50
35	"	Summer Squash,	17 50
114	"	Cucumbers,	68 40
175	"	Tomatoes,	122 50
80	"	Parsnips,	48 00

5	bushels Winter radishes,	$3 75
4	" Peppers,	4 00
9850	Dozen Sweet corn,	985 00
540	Heads of Cabbage,	21 60
150	" Cauliflower,	10 50
3200	" Lettuce,	35 00
240	" Endive,	3 00
2750	Bunches of Radishes,	27 50
2000	" Celery,	80 00
	Parsley,	5 00
2677	Quarts of Strawberries,	401 55
816	" Blackberries,	97 96
532	" Red Raspberries,	63 84
352	" Black Raspberries,	35 20
1563	" Currants,	125 04
36817	" Milk,	2577 19
2375	Lbs. of Beef, live weight,	95 00
5448	" Pork,	435 84
218	" Leaf lard,	30 52
107	" Rough lard,	7 49
44	Pigs,	132 00
10	Calves,	10 00
	Total,	$8393 83

INVENTORY OF FARM PRODUCE ON HAND.

3	Tons of English hay,	$ 60 00
2	" Swamp hay,	20 00
2	" Rye straw,	28 00
	Total,	$108 00

INVENTORY OF FARM STOCK.

1	Pair of working oxen,	$ 200 00
14	Cows,	840 00
2	Heifers,	60 00
1	Calf,	5 00
5	Store Hogs,	100 00
40	Shoats,	480 00
8	Pigs,	24 00
6	Horses	1200 00
	Total,	$2909 00

FARM TOOLS, CARRIAGES, ETC.

2	Ox carts,	$ 130 00
1	Hay cart,	20 00
2	One horse carts,	75 00
1	Deering mower,	60 00
1	Horse lawn mower,	60 00
1	Horse rake,	28 00
1	Cutaway Harrow,	25 00
1	Wheel Harrow,	25 00
1	Smoothing Harrow,	10 00
1	Iron roller,	20 00
3	Landside plows,	20 00
1	Yankee swivel plow,	15 00
1	Shovel plow,	5 00
1	Two-horse cultivator,	23 00
1	One-horse cultivator,	6 00
1	Wheel hoe,	4 00
3	Wheelbarrows,	15 00
1	Horse sled,	12 00
1	Ox sled,	12 00
1	Ox scraper,	3 00
1	Ox shovel,	4 00
1	Seed drill,	4 00
15	Hay rakes,	3 75
9	Garden rakes,	3 60
10	Hay forks,	5 00
16	Manure forks,	8 00
19	Shovels,	11 40
17	Spading shovels,	12 75
25	Spading forks,	12 50
1	Root cutter,	10 00
1	Hay cutter,	10 00
2	Yokes,	6 00
3	Chains,	3 00
1	Drill marker,	5 00
1	Potato digger,	10 00
12	Picks,	12 00
2	Platform scales,	20 00
10	Axes,	10 00

124	Hoes,	$37 20
2	Crowbars,	3 00
13	Baskets,	2 00
1	Set of dry measures,	1 75
5	Scythes and snathes,	10 00
4	Pails,	1 00
1	Stone boat,	3 00
2	Grindstones,	5 00
6	Hand lawn mowers,	48 00
9	Watering pots,	2 25
1	Top buggy,	225 00
1	Phaeton,	50 00
1	Three seated carryall,	200 00
2	Two seated carriages,	575 00
2	Express wagons,	105 00
1	Heavy chair wagon,	250 00
1	Lumber wagon,	50 00
1	Chair sleigh,	30 00
1	Two seated sleigh,	30 00
2	Single sleighs,	27 00
3	Strings of Bells,	6 00
4	Single harnesses,	60 00
1	Set light harness,	40 00
2	Sets double harness,	30 00
	Robes, Blankets, etc.	40 00
	Total,	$2550 20

SCHOOL REPORT.

Number of boys under instruction July 1, 1889, -	458
Number received during the year, - - -	196
Whole number under instruction during the year, -	654
Number discharged during the year, - -	223
Present number under instruction, - -	431

The scholarship of the boys when received is shown by the following statements:

READING.

Who did not know the alphabet, - - -	20
Who could read in first reader, - - -	51
Who could read in second reader, - - -	92
Who could read in third reader, - - -	129
Who could read in fourth reader, - - -	139
	431

WRITING.

Who could not write at all, - - -	36
Who could write easy words, - - -	148
Who could write letters to friends, - - -	247
	431

ARITHMETIC.

Who knew nothing of arithmetic, - - -	99
Who had studied mental arithmetic, - -	159
Who ciphered through simple rules, - -	173
	431

GEOGRAPHY.

Who had never studied geography, - - -	176
Who had studied geography, - - -	255
	431

The following statement shows the proficiency of the boys in the several branches taught in the schools:

Who read in fourth reader,	147
Who read in third reader,	187
Who read in second reader,	67
Who read in first reader,	30
	431

WRITING.

Who can write letters to friends,	361
Who can write easy words,	58
Who can print reading lessons,	12
	431

ARITHMETIC.

Who have studied common fractions,	78
Who have studied in properties of numbers,	58
Who have studied in compound numbers,	62
Who have studied in simple rules,	120
Who have studied in mental arithmetic,	113
	431

GEOGRAPHY.

Who have studied Swinton's complete geography,	114
Who have studied Swinton's elementary geography,	214
Who do not study geography,	103
	431

HISTORY.

Who have studied United States History,	52

THE SCHOOL AND ITS METHODS.

The following description of the School and its methods, is copied mainly from our last Annual Report:

The Connecticut State Reform School for delinquent and wayward boys is beautifully located upon a high elevation of land in the city of Meriden, a thriving manufacturing city, with a population of 30,000 inhabitants, situated on the New York, New Haven & Hartford Railway, midway between the cities of Hartford and New Haven. The buildings of the Institution are less than half a mile from the center of the city, and are only ten minutes walk from the railroad depot.

The farm belonging to the Institution lies in the rear of the buildings, and contains one hundred and ninety-five acres of land, one hundred acres of which are comparatively level, and well adapted to the raising of small fruits and garden vegetables, for which purposes it has already been largely appropriated. The balance of the land is somewhat broken, a portion being covered with a thick growth of small timber, while the remainder furnishes good pasturage for the stock. A living stream of pure water runs through the farm near its center.

The buildings of the Institution are mostly of brick, and are well constructed. They consist of one central building, five cottage buildings, a church edifice, a large boiler and coal house, a conservatory, a bake house, a large hay and cow barn, a horse barn and carriage sheds, cattle sheds, hennery, piggery, woodhouse, etc.

The main or central building fronts the East, is 300 feet long by 50 deep, the central portion being four stories high above the basement, the wings on either side being three stories high. Attached to the rear of the main building, on the West, is also a wing 120 feet long by 40 feet wide, which is three stories high above the basement. In the basement story of the main building are located the kitchen, laundry, engine room, six store rooms, milk room, two large play rooms, two bath rooms and two rooms for storage of coal. The

kitchen is furnished with three large steam kettles for cooking purposes, the steam being supplied from the boilers at the boiler house. There is also a six-horse power vertical boiler in the kitchen, to be used in case of an accident to the other boilers, and on Sundays when the large boilers are not in use.

The bakery and bread room are conveniently connected with the kitchen, and are under the same supervision.

The laundry is supplied with three of the Nonpareil washing machines of the largest size, and a large mangle. The accommodations for drying clothes by steam are ample. There are also conveniences for making starch and for preparing soap for the machines by steam.

The engine room contains a boiler of 25-horse power, and an engine of 15-horse power. The power is used in running the machinery of the laundry; also for running 125 sewing machines.

There are two play rooms, one for each division of the School, which are nicely furnished with settees sufficient to seat all of the boys, and the rooms are pleasantly decorated with pictures and paintings of various kinds, and are very well supplied with newspapers and magazines. These rooms furnish a pleasant place for boys who desire to spend a portion of their play time in reading or in innocent games.

The bath rooms are supplied with a plunge and shower bath. By the aid of steam the shower can be made of any desired temperature. The accommodations are so ample that all of the boys can be thoroughly bathed in thirty minutes. The rooms are well provided with looking glasses, combs, and brushes, and pleasant conveniences for obtaining cool drinking water at all times.

The first story of the main building above the basement contains one general office, a private office for the Superintendent, one reception room, a library room, four large school rooms with a seating capacity for one hundred boys each, one recitation room, two large wardrobe rooms for boys' Sunday clothing, one officers' sitting room, private dining room and kitchen for the Superintendent's family, large dining room and kitchen for the officers of the Institution, two large dining rooms with a seating capacity for 375 boys, together with numerous closets, pantries, halls, etc.

The second story contains parlors and sitting room, bed chambers and closets for Superintendent's family, six rooms for officers, four

large shop rooms and two sleeping halls. The shop rooms are in the rear wing, and are used for the manufacture of shirts. One hundred and twenty-five sewing machines, run by steam, are used in these manufacturing rooms.

The sleeping halls have a capacity for comfortably lodging 375 boys. The halls extend to the top of the building, and are sufficiently high to admit of two corridors above the main floor. The halls are light and pleasant, with good ventilation. They are furnished with single bedsteads, good mattresses, feather pillows, and plenty of bedding adapted to the season. The halls are also provided with six night closets, conveniently located, and with hydrants, from which good drinking water can be obtained at all times. A night watchman looks carefully after the wants of the boys during sleeping hours.

The third story, in the center and end wings, contains fifteen rooms, which are used for guest chambers and sleeping rooms for officers of the Institution. In the rear wing of this story, there is a large shop where one hundred boys labor at cane-seating chairs, and a band room.

The fourth story of the central portion of the building is used for hospital purposes, with rooms for the nurses, etc. The hospital contains nine wards, and is provided with hot and cold water, and all conveniences necessary for making the sick comfortable.

In the rear of the main building there are two yards, surrounded by a high fence, in which the boys have ample time for exercise and play. There is also a yard of three acres of ground, containing a pleasant grove of chestnut and oak trees, surrounded by a neat picket fence, five feet high, where the boys are often permitted to play, and where, in the summer time they enjoy their holiday sports. The grounds surrounding the buildings are tastefully laid out, and are well set with ornamental shrubs and flowers. The boys in the main building or Congregate Department of the School, number about 200.

Five cottages have recently been built, that very comfortably accommodate fifty boys each. They are built of brick, are three stories high above the basement, and cost about $16,000 each. The basement contains a large play room, a room for storage, two bath rooms, and a fruit cellar. All the basement rooms are well lighted and warmed, where heat is needed.

The first story contains a large school room handsomely seated and furnished, officers' private rooms, a bath room, reception room, two dining rooms, a kitchen and pantry, and two halls.

The second story contains a sleeping hall for twenty boys, a hospital room, a teachers' room, a bath room, a room for boys' Sunday clothing, a store room for bedding, etc., and a large shop room.

The third story contains a sleeping hall for thirty boys, a bath room, and a store room for bedding.

The buildings are finished in hard wood, are well furnished in every department, are lighted with gas, supplied with water from the city reservoir, and warmed by steam.

The buildings differ architecturally in their outside appearance, but are substantially the same in their interior arrangements. Each cottage is supervised by a gentleman and his wife, and one lady teacher. They are conducted on what is known as the Open or Family plan, the boys being held in their places by kindness and home influences, instead of the more arbitrary appliances of bolts, bars and high fences.

The chapel edifice is a beautiful structure, with a seating capacity of five hundred boys. It contains a large platform, with convenient side rooms, which afford excellent facilities for giving concerts and other appropriate entertainments. A grand piano stands upon the platform. The chapel was erected at a cost of about $15,000.

The boiler house is a solid structure of brick and stone work 35 by 57 feet, and is two stories high. The lower story is 18 feet high, and contains a room for three boilers of 60-horse power each, and a coal room that furnishes storage for 300 tons of coal. The boiler room contains a receiving tank, force pump and all apparatus necessary to supply all the buildings with steam sufficient to warm them well and in the most approved manner, and to drive the machinery in the laundry and in the manufacturing department. The chimney stack is 80 feet high, and gives an excellent draught in all kinds of weather. The upper story of the building contains a shoe shop and living room for the engineer.

The farm buildings are commodious and afford storage room for all the carriages and smaller implements necessary for the farm and for the use of the Institution. The main barn is 83 feet in length by 42 feet in width, and is three stories high. The lower or ground floor is used as a manure cellar, and for storing the winter supply

of vegetables, the two being separated by a heavy cemented wall or stone. The capacity of these is about forty cords of manure and two thousand bushels of vegetables. The middle story contains the stabling, running the entire length, arranged for the comfort and cleanliness of the stock, two rooms for such animals as need seclusion, a bedding room and bays for hay, which extend through the upper story to a height of twenty-five feet. The third story contains the driving floor, where the hay and other fodder, as well as the grain, are all drawn and stored, a feed room and rooms for the smaller farm tools. Above the floor is a large space for grain or hay. The building is capable of storing seventy tons of hay, and is in all respects a model of convenience and economy of labor. Connected with this building by a carriage shed, is a horse barn, 30 feet in length by 24 feet in width, conveniently divided into stabling, a harness room, and a lodging room for the hostler, while above these is ample room for bedding, hay and other feed. There is also attached to the main barn a shed, 54 feet by 20 feet, which furnishes additional stalls for cattle, as well as protection for the spring water with which the stock are supplied, and for the more bulky farm implements. Another building near these, 32 feet by 20 feet, is used also for storing farm implements.

The piggery stands about 500 feet from the main or school building, and consists of a brick front, 34 feet by 20 feet, in which the cooking for the swine is done, and also the slaughtering of the pork. Extending from this is a wooden building, 65 feet by 12 feet, where the swine are kept. This is divided by movable partitions into eight pens, or less, if desired, and is arranged with special reference to the comfort of the animals, and ease and convenience in their care.

The neat stock kept upon the farm include sixteen milch cows, two heifers, and one pair of working oxen. None of these are full blooded, but are, with a single exception, Jersey or Ayrshire grades, and were nearly all raised upon the farm. No animals of this class are kept after they become unprofitable, from old age, or failure of any kind, but are always converted into beef and sold. The service of five horses is required for freighting, driving and farm work. The swine kept are nearly all Berkshire grades, and vary in number from twenty to forty. Very little grain is fed to them, as the number kept depends upon the amount of feed supplied by the Institution.

WATER SUPPLY.

The Institution is supplied with water from two sources. The water of a never failing spring, one mile and a quarter away, owned by the Institution, is conducted by a three inch pipe to the buildings, and furnishes sufficient for cooking and drinking purposes; also all needed water for the barns and piggery, and for irrigation at various points upon the farm. For the boilers, laundry, closets and all general purposes, the supply is obtained from the city water works. The pressure of this water is about eighty-five pounds, and is sufficient to force the water to any part of the buildings, in case of fire. The Institution has three convenient hydrants and hose, that may be used should the necessity for their use ever occur.

GAS.

The Institution is supplied with gas from the city gas works.

INDUSTRIES.

There are six shops in the Institution that give employment to over four hundred boys. In the tailor shop, where the clothing worn by the boys is made and repaired, twenty boys are employed. About two hundred and twenty-five boys work at cane-seating chairs in two different shops. A shoe shop gives employment to a small class. The farm and garden, in the summer time, call for a class of from thirty to forty boys; in the winter, a small class cares for the stock and does the necessary work about the premises. From eight to ten boys work at the green-house and on the lawns. The laundry, dining rooms, kitchen, sleeping halls, etc., all require classes from six to ten boys each.

FOOD.

The dietary of the Institution, while it does not embrace the variety ordinarily found on the tables of well-to-do people, still the quality of the food daily placed before the boys could be no better. The bread is made from a good grade of white flour; the meats used are of the best quality, and the vegetables are supplied abundantly from the Institution gardens, and embrace a full variety of such kinds as are found in the best market gardens. Coffee is furnished for breakfast and supper, in which all the milk from the Institution dairy is used, averaging from one hundred to two hundred quarts daily. Once a week a bountiful dinner of fish or fish chowder is given. The tables are supplied daily with butter or molasses, and, on Sunday, pies are given at dinner and cakes for supper. On Thanksgiv-

ing day a bountiful turkey dinner is furnished, and, on all other holidays, the tables are spread with all the delicacies of the season. The boys are allowed all they want to eat at every meal, and no boy need ever leave the table hungry. The deprivation or a change of food is never allowed as a punishment. The tables are nicely covered with white oil cloth, and are spread with white porcelain ware, silver plated knives and forks, spoons and casters. Good manners are taught and required at meal time.

CLOTHING.

The boys of the Institution are clothed in the best quality of all-wool gray cloth for pantaloons, and dark indigo blue army goods for jackets. Heavy Amoskeag Hickory is used for shirting; their caps are made to order from all wool blue cloth, and their shoes and stockings are of good quality. They dress in Summer in lighter goods, according to the season.

RECREATION.

All holidays are devoted entirely to recreation and play. Portions of each week day, that will equal at least two hours of time, are also given for play. On Saturday afternoon, when the weather is suitable, the boys go to the ball grounds, in an open field of many acres, where they enjoy full freedom in playing ball, or such games as may suit their tastes best. Many opportunities are given to attend appropriate amusements at the Opera House in the city, and frequent rehearsals, concerts and exhibitions are given for the benefit of the boys in our own chapel. They attend the Agricultural Fairs given in the park near by, and always take part in the ceremonies on the day devoted to the decoration of the soldiers' graves.

RELIGIOUS AND MORAL INSTRUCTION.

Two services are held in the chapel each Sabbath; Sabbath school in the morning and preaching in the afternoon.

The "International Lesson Leaves" are used in the Sunday school. These lessons, with the explanation, prayers, responsive exercises and music, make a very interesting and profitable service.

The ministers from the several churches of the city preach in their turn at the Sunday afternoon service.

The Sisters of Mercy instruct the Catholic boys of the School an hour each Sabbath.

Devotional exercises are held morning and evening each day of the week, and grace is said before all meals.

There is a moral review every evening, at which time a record is made in a book kept for the purpose, of every boy's conduct during that day. These records determine a boy's standing in the School at all times.

SCHOOL.

All the boys attend school three hours each week day, ten months in the year. The schools embrace ten grades or divisions, which give every boy the opportunity to attend a class exactly adapted to his scholarship, and as a rule, substantial and praiseworthy progress is made in study. Much attention is given to the subjects of reading, writing, spelling and arithmetic. Any boy, with an average mind, can, while at school, obtain an education that will fit him to transact the ordinary business of life.

MUSIC.

Much attention is given to music, both vocal and instrumental. All the boys are taught vocal music, and about thirty boys are under constant training in instrumental or band music. Great proficiency is made in both departments.

SENTENCES.

Boys between the ages of seven and sixteen years can be sent to the School during the minority, by any court of record in the State. Parents or guardians may secure the admission of their sons or wards, without process, by paying $3 per week, quarterly and in advance for their board.

DISCHARGES.

Boys are dismissed on probation, after they obtain the "Honor Grade," and this grade, by uniform good conduct, can be attained in one year after entering the School. By indifferent or bad conduct, promotions are lost, and, as a result, the time for a boy to remain in the School is lengthened.

All boys that go out on leave of absence are required to communicate with the Institution once in six months, and by failing to do so, they are at once looked after by the authorities of the School. A record is kept, as far as is possible, of every boy's conduct after he leaves the Institution.

The Board of Trustees has discretionary power to dismiss any boy from the Institution, whenever the interests of the School or the boy will be promoted by such dismissal.

NAMES, RESIDENCES, COMMISSION AND RETIREMENT OF THE TRUSTEES OF THE STATE REFORM SCHOOL, FROM ITS COMMENCEMENT TO THE PRESENT TIME.

Date of Commission.			Date of Retirement.
1851,	Gideon Wells,	Hartford,	1853
1851,	Phileman Hoadley,	New Haven,	1857
1851,	E. S. Abernethy,	Bridgeport,	1853
1851,	A. N. Baldwin,	West Milford,	1855
1851,	Philo M. Jackson,	Norwich,	declined
1851,	Erastus Lester,	Plainfield,	1854
1851,	Henry D. Smith,	Middletown,	1853
1851,	John H. Brockway,	Ellington,	1852
1853,	Philip Ripley,	Hartford, died in office,	1863
1853,	David Patchen,	Weston,	1854
1853,	John P. Gulliver,	Norwich,	1854
1853,	John S. Yeomans,	Columbia,	1856
1853,	James Phelps,	Essex,	1855
1854,	Fred S. Wildman,	Danbury,	1858
1854,	Moses Pierce,	Norwich,	1856
1854,	John Gallup, (2d)	Brooklyn,	1858
1855,	Sylvester Spencer,	Litchfield, resigned,	1858
1855,	Elihu Spencer,	Middletown,	declined
1856,	Moses Culver,	Middletown,	1858
1856,	Thomas Clark,	Coventry,	1860
1856,	W. P. Benjamin,	New London,	1876
1857,	W. S. Charnley,	New Haven,	declined
1858,	E. W. Hatch,	Meriden, resigned,	1859
1858,	Horace Gaylord,	Ashford,	1862
1858,	David P. Nichols,	Danbury,	1875
1858,	Thomas A. Miller,	Torrington,	1859

Date of Commission.			Date of Retirement.
1858,	Benjamin Douglass,	Middletown,	1876
1859,	Hiram Foster,	Meriden,	1873
1859,	Daniel G. Platt,	Washington, died in office,	1871
1859,	Henry McCray,	Ellington,	1876
1862,	Roswell Brown,	Hartford, died in office,	1877
1862,	William Swift,	Windham,	1866
1863,	Henry B. Hubbard,	Middletown,	declined
1866,	James B. Whitcomb,	Brooklyn,	1874
1871,	George Langdon,	Plymouth,	1875
1873,	Hiram A. Yale,	Meriden,	1877
1874,	S. B. Cocks,	Huntington, resigned,	1876
1874,	F. O. Bennett,	Willimantic, retired,	1882
1875,	Delos H. Stevens,	Barkhamstead, retired,	1889
1875,	Chas. Fitzgerald,	Middletown,	still in office
1875,	Edward W. Seymour,	Litchfield, retired,	1876
1875,	Goodwin Collier,	Hartford, retired,	1876
1875,	Charles L. English,	New Haven,	resigned
1876,	John M. Brewer,	Norwich, died in office,	1878
1876,	G. H. Preston, M. D.,	Tolland, " "	1883
1877,	Vincent Colyer,	Darien, retired,	1886
1877,	John L. Houston,	Thompsonville,	still in office
1878,	A. P. Willoughby,	Norwich, retired,	1879
1879,	Charles Fabrique,	New Haven, died in office,	1889
1879,	J. S. Lathrop,	Norwich,	still in office
1879,	Theodore Bird,	Bethlehem,	" "
1882,	Albertus S. Bruce,	Pomfret,	" "
1883,	Charles F. Sumner,	Bolton,	" "
1886,	John K. Butler,	Darien,	" "
1889,	James N. States,	New Haven,	" "
	RESIDENT TRUSTEES.		
1877,	Isaac C. Lewis,	Meriden,	" "
1877,	Charles L. Upham,	"	" "
1877,	Owen B. Arnold,	"	" "
1887,	D. S. Williams,	"	" "

NAMES OF SUPERINTENDENTS

—OF—

CONNECTICUT STATE REFORM SCHOOL.

Date of Appointment.	NAMES.	Date of Retirement.
1853,	PHILIMON HOADLEY,	1855
1854,	SAXTON B. LITTLE, Ass't Supt.,	1875
1855,	ROSWELL HAWLEY, M. D.,	1859
1858,	EDWARD W. HATCH, M. D.,	Died Feb 7, 1874
1874,	SAXTON B. LITTLE, Acting Supt.	July 1, 1874
1874,	EDWARD INGHAM,	July 1, 1876
1876,	S. B. COCKS,	Dec. 1, 1877
1877,	J. W. BROWN, Acting Supt.,	April 23, 1878
1878,	GEO. E. HOWE,	Still in Office.

FORM OF INDENTURE ADOPTED BY THE TRUSTEES.

To the Trustees of the Connecticut State Reform School:

I hereby request that the boy named

received as indentured, according to the law, to the STATE REFORM SCHOOL, at MERIDEN, and I hereby bind myself and agree to the following conditions, viz.:

The price of board, education, training and clothing for said boy, shall be at the rate of THREE DOLLARS per week, payable quarterly in advance, and the said is bound to remain in the Institution for the term of months, entitled to the same supervision, medical treatment, support and education, and subject to the same regulations, employment and restraint as all other inmates of said School.

[SIGNED.]

CIRCULAR OF
INFORMATION TO PARENTS AND GUARDIANS.

We take this method of informing you that
your was this day duly received at this Institution, here to remain during his minority, or until otherwise discharged in accordance with the rules of the School. Any boy by uniform good conduct can reach his "Honor Grade" in one year from the time he enters the School. He is then given a probationary discharge to go to his home, where he will be permitted to remain as long as he does well. If his conduct in the School is not good, the time for his receiving his prohibitory discharge will be increased. For your further information, it is proper to state that the Institution is not a prison—but a School for detention and reform—where the inmates receive such instruction and training as are best adapted to form and perpetuate a virtuous character, to establish habits of industry, and to advance them in those branches of knowledge which are taught in the Common Schools of the State. They are here provided with a home in every way pleasant and comfortable, are furnished with steady employment, of a kind that will aid them in earning an honest living after they leave the School. They have appropriate seasons for recreation and play, are well fed and clothed, and, when sick, have the best of care and medical attendance. They attend school regularly six days of the week, are taught by efficient and experienced teachers, and on Sunday enjoy the privileges of the Sabbath school, and one regular Chapel service, over which some minister of the Gospel from one of the city churches presides. The Catholic boys of the School receive one hour of instruction each Sabbath from the Sisters of Mercy.

In order to accomplish the wise ends for which this Institution was established, to wit: the reformation of boys entrusted to its care, it will be necessary for them to remain in School for a sufficient

length of time to receive such training and discipline as will serve to reform their evil ways, and to establish in them correct moral principles and habits of industry.

Applications for the discharge of boys from the Institution are frequently made in a short time after their commitment, but, of course, these applications are not entertained. Experience has taught the management that the best interests of the School are promoted by treating the boys all alike, and by requiring all to procure their "Honor Badge" before leaving the School. If there is a deviation from the rule in a *single* case, every other boy has the *right* to ask for the same deviation in *his* case, and the Institution would soon lose its reformatory character.

Parents, guardians and other near friends are permitted to visit the boys on the first Wednesday of each month, at which time no pains will be spared in giving all information sought for, in relation to the standing of any boy in the School.

The boys are permitted to write to their friends once a month, and the friends are allowed to write to the boys at their pleasure. In case of the serious illness of any boy, his friends will at once be advised of his condition.

AMENDMENTS TO LAW
RELATING TO THE REFORM SCHOOL, MERIDEN.

Be it enacted by the Senate and House of Representatives in General Assembly convened:

Section 1. Whenever any boy under the age of sixteen years shall be convicted of any crime or misdemeanor, punishable by fine or imprisonment other than imprisonment for life, the Court or Justice of the Peace, as the case may be, may commit him to the Reform School, to remain until he shall arrive at the age of twenty-one years, unless sooner discharged by the Board of Trustees. And the Judges of the Criminal and Police Courts of the States, and Justices of the Peace shall have power to commit to the Reform School: first, any boy under sixteen years of age, who may be liable to punishment by imprisonment under any existing law of the State, or any law that may be enacted and in force in the State; second, any boy under sixteen years of age, with the consent of his parents or guardian, against whom any charge of committing any crime or misdemeanor shall have been made, the punishment of which, on conviction, would be confinement in jail or prison; third, any boy under sixteen years of age, who is destitute of a suitable home and adequate means of obtaining an honest living, or who is in danger of being brought up, or is brought up, to lead an idle or vicious life; fourth, any boy under sixteen years of age, who is incorrigible or habitually disregards the commands of his father or mother or guardian, who leads a vagrant life, or resorts to immoral places or practices, or neglects or refuses to perform labor suitable to his years and condition, or to attend school.

Sec. 2. That every boy sent to the Reform School shall remain until he is twenty-one years of age, unless sooner discharged or

bound as an apprentice: but no boy shall be retained after the Superintendent shall have reported him fully reformed.

Sec. 3. That whenever there shall be as large a number of boys in the School as can be properly accommodated, it shall be the duty of the President of the Board of Trustees to give notice to the Criminal and Police Courts of the fact: whereupon no boys shall be sent to the School by said Courts, until notice shall be given them by the President of the Board that more can be received.

Sec. 4. If any person shall entice or attempt to entice away from said School, any boy legally committed to the same, or shall knowingly harbor, conceal or aid in harboring or concealing any boy who shall have escaped from said School, such person shall, upon conviction thereof, be deemed guilty of a misdemeanor, and shall pay a fine of not less than ten or more than one hundred dollars, which shall be paid to the Treasurer of the Board of Trustees; and every sheriff, deputy sheriff, constable, or officer of the local police, or any officer or employee of said School, shall have power, and it is hereby made his duty to arrest any boy, when in his power to do so, who shall have escaped from said School, and return him thereto.

Sec. 5. That the Trustees shall have full power to place any boy committed as herein described during minority, at such employment, and cause him to be instructed in such branches of useful knowledge as may be suitable to his years and capacity, as they may see fit; and they may, with the consent of any such boy, or his parents or guardians, bind him out as an apprentice during his minority, or for a shorter period, to learn a trade or to other employment, as in their judgment will tend to his future benefit; and the President of the Board shall, for such a purpose, have power to execute and deliver on behalf of the said Board, indentures of apprenticeship for any such boy; and such indentures shall have the same force and effect as indentures of apprenticeship executed by his legal guardian, and shall be filed with the records in the office of the Reform School.

Sec. 6. In case any boy so apprenticed shall prove untrustworthy and unreformed, the Trustees may, at their discretion, receive such boy into the Reform School, to be held in the same manner as before his said apprenticeship, and may thereupon cancel the indentures of such boy. And if, in the opinion of the Trustees, any boy apprenticed out by them shall have an unsuitable home, or if the

person to whom such boy is indentured shall become unfit or incapable to properly raise or take care of him, the Trustees may, at their discretion, return such boy to the School.

Sec. 7. Whenever a boy is dismissed from the School to his parents, or to otherwise care for himself (except by indenture, as in the foregoing section,) he shall be dismissed on probation merely, and the Board of Trustees shall have power to send for and return him to the School, when, in the opinion of a majority of the members of said Board, the interests of the boy will be promoted by such return.

Sec. 8. All acts inconsistent with the foregoing are hereby repealed.

An Act in Addition to an Act Entitled "An Act Concerning Education."

Resolved by this Assembly: That in the several Reform Schools in this State, equal privileges shall be granted to clergymen of all religious denominations to impart religious instructions to the inmates therof; and that every opportunity be allowed such clergymen to give to the inmates belonging to their respective denominations such religious and moral instructions as said clergyman may desire, and the Trustees of said Institution shall prescribe reasonable times and places, not inconsistent with the proper management of said Institution, when and where such instruction may be given, and such instruction shall be open to all who may choose to attend.

Approved July 25, 1874.

BY-LAWS.

Meetings of the Trustees.

Section 1. There shall be a regular meeting of the Board of Trustees held at the School in Meriden on the second Wednesday of January, April, July and October in each year, and the July meeting shall be the annual meeting.

Sec. 2. Special meetings shall be called by the President of the Board at the written request of two members, provided that ample notice and the object of such meetings shall be given.

Sec. 3. A majority of the members shall constitute a quorum for the transaction of business, but a smaller number present at any regular or special meeting may adjourn to any specified time.

Sec 4. The Board of Trustees shall be organized annually at the regular meeting held in July, by the election by ballot, of a President, Secretary, Treasurer, an Executive Committee to consist of three members, and an Auditing Committee to consist of two members.

President.

Sec. 5. It shall be the duty of the President to preside at all the meetings of the Board, but in his absence, the Board shall appoint a chairman *pro tem.*

Secretary.

Sec. 6. It shall be the duty of the Secretary to keep an accurate record of all proceedings of the Board, in a book provided for that purpose, which shall, at all times, be open to the inspection of any member; to prepare all documents and statements which may be ordered by the Board; to take charge of all communications and reply thereto in accordance with such instructions as he may receive from the Board or Executive Committee.

Treasurer.

Sec. 7. The Treasurer shall receive and disburse the moneys of the Institution, and keep a true and just account of the same. He shall pay no bills except on an order drawn by the Superintendent, and countersigned by the Executive Committee, and for the faithful performance of his duties he shall give a satisfactory bond in the sum of eight thousand dollars.

Executive Committee.

Sec. 8. It shall be the duty of the Executive Committee to make, or order the Superintendent to make, all purchases for the School, to authorize such repairs as may, from time to time, be necessary; but no expenditures for repairs exceeding one hundred dollars shall

be authorized except by the Board. They shall examine as to whether economy is observed in the different departments of the School, and the quantity and quality of food and clothing furnished. They shall, once in each month, or oftener if they choose, without notice to Superintendent or other officers, inspect the school buildings, and all the departments, rooms and closets thereof; and see that all are kept perfectly clean and neat; they shall inquire into the behavior of all officers and employees, and in a book kept for that purpose, enter all their proceedings and observations, which book shall be laid before the Board at every meeting. They shall also, at each monthly meeting, examine all bills presented by the Superintendent, and if found correct, approve the same.

Sec. 9. There shall be as many meetings of the Executive Committee as the interests of the School require.

Auditing Committee.

Sec. 10. It shall be the duty of the Auditing Committee to examine the accounts of the Treasurer thoroughly and minutely, up to the 30th day of June in each year, and report thereon to the Board at the next regular meeting.

Officers.

Sec. 11. The following named officers of the School shall be appointed by the Board of Trustees, whenever their services may be required, viz.: a Superintendent, an Assistant Superintendent, Bookkeeper, Matron, Teachers, Overseers of the Workshops and a Farmer.

Sec. 12. The several officers shall hold their appointments during the pleasure of the Board, and no resignation shall take effect until three months after being tendered in writing, except by consent of the Board of Trustees.

Superintendent.

Sec. 13. The Superintendent shall have the general charge of the Institution.

He shall see that the subordinate officers are punctual and faithful in the discharge of their respective duties, and that the regulations and by-laws are carefully observed.

He shall keep a journal and make a record of all occurrences worthy of notice, which shall be subject to the inspection of any member of the Board.

He shall perform all the correspondence, keeping files of all letters received and copies of those sent, as far as important for reference. In suitable books he shall keep regular and complete accounts of all property entrusted to his care, showing the expenses and income of the Institution.

He shall make out and present to the Treasurer of the Institution the bill for weekly board of inmates, and perform all the duties of this department according to law.

Under the advice and direction of the Executive Committee he

shall procure the necessary supplies for the Institution, and purchase all such articles and materials as may be wanted for the support and employment of the boys, and dispose of all articles raised on the farm, or manufactured by them, which are not wanted for usê.

In a suitable book, he shall keep an account of all purchases, and the cost for delivering the same at the Institution.

He shall daily inspect every part of the premises, and have a watchful care over the inmates, and be responsible for the proper care and discipline of the boys.

He, or the Assistant Superintendent, shall examine all packages and letters, received for the boys, and shall examine their letters before being sent away.

He shall see that they receive no detriment to health from want of snfficient clothing by day or by night, from wet or cold, or from any other exposure, and that the rooms and buildings are properly warmed and ventilated.

He shall employ, whenever necessary, suitable persons for any temporary services not provided for in these by-laws, and report the same to the Executive Committee.

At each quarterly meeting he shall report to the Board the number of boys committed to the Reform School, also communicate full information of the state of the Institution, and make such suggestions as he may think proper for the consideration of the Board.

At each July meeting he shall furnish the Board with a duplicate copy of his accounts, presented to the State Comptroller of Public Accounts, up to the 30th day of June; also a full schedule of all property of the Institution, including everything in the care of the Farmer.

He shall at all times be ready to perform whatever other services may be required by the Board of Trustees, for the benefit of the Institution.

The Superintendent shall have the direction of the moral and religious instruction of the inmates. He shall perform devotional service morning and evening; have charge of the Sabbath school, and obtain such aid from the reverend clergy in the vicinity as may be necessary.

He shall occasionally give familiar expositions of moral and religious duty in such a manner as he shall deem most conducive to the good of the boys, and at such times as may be determined on by consultation with the Trustees.

He shall mingle freely with the boys in kind, familiar intercourse, and spend as much time with them in conversation as he may think for their benefit, and as will be consistent with the proper performance of his duties, and his position in the Institution.

At the quarterly meeting of the Trustees in July, he shall make a report, stating all facts respecting the reformatory influence effectively made use of in this Institution.

Assistant Superintendent.

Sec. 14. The Assistant Superintendent shall assume and perform all the duties of the Superintendent during his absence or inability.

The Matron.

Sec. 15. The Matron shall have the general charge and direction of all the domestic arrangements of the family, and shall see that cleanliness, order and propriety are uniformly maintained in her departments.

She shall see that all female assistants, except teachers, are diligent and faithful in the discharge of their respective duties, discreet and regular in their deportment, and strict in their observance of all the regulations of the Institution, and shall report to the Superintendent any remissness that may come to her knowledge.

She shall confer and advise with the Superintendent respecting the duties of the persons employed in the departments under her charge, and also as to the general management of the house.

Teachers.

Sec. 16. The teachers shall instruct the boys in such branches of education as may be required by the Superintendent, and shall use all proper means to inspire them with a love of study, and lead them justly to estimate the value of a sound and practical education, and shall constantly strive, by precept and example, to impress on their minds the importance of good order, self-government, and purity of body and mind.

They shall take charge of the boys at all times in the school-rooms and shall require them to be promptly in their places at the appointed time, unless they are absent by permission of the Superintendent.

They shall attend to the cleanliness and good order of the school-rooms, and shall be responsible for the safety, care and preservation of all books, furniture, apparatus and fixtures provided for the same; and by strict personal examination see that no injury or waste is suffered.

They shall assist in the Sabbath School, in the care of the boys on the Sabbath, in vocal music, and the principal teacher shall act as librarian to the boys.

Overseers of Workshops.

Sec. 17. The overseers of the workshops shall take charge of all tools used in their respective departments, and see that the same are carefully preserved and accounted for; shall see that all stock and material are worked with prudence and economy, and properly manufactured. They shall keep accurate accounts of the number of boys and time employed each day, of the work done and of all articles made, and how disposed of. They shall attend to the cleaning, warming and ventilation, and keep a daily record of the temperature of their workshops.

They shall have charge of the boys during the work hours in the shops; shall exercise a prudent and judicious oversight; see that industry and good order are constantly observed, and return them to the yard, or such other place, and at such time as may be ordered by the Superintendent. They shall also assist the teachers, if requested, in their duties on the Sabbath, and in the Sabbath School.

Watchmen.

Sec. 18. The Superintendent will have power, with the approbation of the Executive Committee to appoint one or more watchmen for night duty, whenever it is considered necessary for the safety of the Institution.

The watchman on duty shall, if required, perform a regular patrol throughout and around the building. He shall use the utmost vigilance to guard against damage by fire, to prevent escapes, and promptly notify the Superintendent on the first cause of alarm. He shall ring the bell in the morning, and at other times, as may be directed, and perform any other service required by the Superintendent.

The Farmer.

Sec. 19. The Farmer, under general or specific directions of the Superintendent, shall have charge of all the farming operations, and shall be responsible for the proper management, good order, and economical use of everything connected therewith, and shall use every means in his power to increase and preserve the products of the farm.

He shall take charge of, work with, and be responsible for such boys as the Superintendent may detail to be employed on the farm, and must patiently and perseveringly instruct them in the various kinds of farm work; require of them prompt obedience, and must, by example, together with constant and vigilant supervision, teach them to faithfully perform all duties required of them.

He shall see that all domestic animals are cared for in the best manner, well fed, properly cleaned and kindly treated.

He shall keep an accurate account of everything purchased for, the labor performed on, and the amount of each kind of produce raised on the farm.

He shall see that all rules and regulations of the Institution are strictly observed by all persons under his care, and shall promptly report to the Superintendent any one who may refuse or neglect to comply therewith.

The Library.

Sec. 20. A library of well selected books and maps and of Sunday School books shall be kept at the School for the use and improvement of inmates thereof.

The Superintendent, Librarian and Chairman of the Executive Committee shall be a Standing Committee on the Library, who shall have in charge the efforts, ways and means to promote this depart-

ment of the Institution, and they shall report to the Board of Trustees, at the quarterly meetings, the progress and condition of the Library, with a full list of all donations received for this object.

Visitors.

Sec. 21. Visitors will always be welcome to visit the School between the hours of 9 A. M. and 4 P. M. on week days, and on Sundays for the purpose of attending the religious exercises, but on that day they must leave immediately after the services are ended.

Parents will not be permitted to visit their children oftener than once a month, unless by special permission of the Superintendent; and any article designed for any inmate must pass through the hands of the officer in attendance.

Visitors passing through the house or shops must not go among the boys or address any conversation to them, except by permission of the attending officer.

Any visitor who shall attempt to give any inmate tobacco or other articles secretly, shall be altogether excluded from the premises.

Visitors will not be permitted in or on the premises, except attended by an officer of the Institution.

General Regulations.

Sec. 22. The distribution of time for each working day shall not be less than six hours for labor, four hours for school and from four and one-half to five hours for devotional exercises, incidental duties and recreation.

The time of rising shall be half-past five o'clock A. M., from the first day of March to the first day of November and at six o'clock during the other four months. The time of retiring shall be at eight o'clock P. M.

All persons having requisite duties to perform shall rise promptly at the ringing of the morning bell.

No person regularly employed at the Institution shall be absent from his or her duties without permission from the Superintendent or his Assistant, and persons getting such permission will be required to procure a substitute, to be approved by the Superintendent, to fulfill his or her duties during their absence.

It shall be incumbent on each officer to see that all rules and regulations are strictly observed, and they shall promptly report any failures therein. As the great object is *reform*, the intercourse of *all* with the boys should be so conducted as to convince them that this object is the chief end and aim of the School.

Every boy shall at all times be in charge of some responsible person, unless otherwise directed; any boy escaping by or through the neglect or carelessness of any officer, the whole or part of the expense incurred in his capture may be charged to such officer and deducted from his salary by order of the Trustees.

No person shall take or detain a boy from the performance of one duty to discharge another, without direction from the Superinten-

dent; and no boy shall be kept or allowed to remain out of School without special permission from the Superintendent.

Any person having charge of the boys during their time of recreation, shall see that a kind and proper tone of feeling is observed among them, and that they do not use violence, or injure each other's clothing, or mar or deface the buildings, fixtures or furniture.

All persons employed at the Institution who are in health and can leave their appropriate duties at the time, shall attend the daily devotional exercises, and the religious services on the Sabbath, unless special leave of absence is granted.

No spirituous liquors or intoxicating drinks shall be brought to the Institution, unless by order of the physician. No officer or assistant shall at any time make use of such liquor, nor shall any one make use of tobacco, or smoke a pipe or cigar on or about the premises.

No tobacco shall be furnished or allowed to the delinquents in any form.

No officer shall be compelled to perform any duty inconsistent with those regularly assigned to him; but as this Institution is to be a family, as well as a School for detention and reformation, duties will occur growing out of this double relation which no by-laws can clearly indicate or provide for; therefore *all* are expected to act agreeably to the *spirits* as well as the *letter* of these rules and regulations, and hold themselves ready at all times for any emergency to aid in preserving order, preventing escapes, and maintaining the rules and discipline of the School, and by general and constant acts, accommodation, firmness and kindness accomplish the desired object.

Discipline.

The discipline shall be that of the family, the school, the workshop and the farm, and not that of the prison. The inmates are to be watched over as pupils, and not guarded as prisoners or criminals; and there shall be no more restraint than shall be necessary to develop them good, and repress bad qualities. Self-instruction, self-desire to labor, and self-government shall be incalculated and encouraged as the best culture as well as the most effective discipline.

Punishment shall be imposed as a public judgment, in manner and form to be prescribed by the Superintendent, and never under the excitement of the moment. Its severity shall always be proportionate to the magnitude of the offense. It shall consist of deprivation of food or play, marks of disapprobation or demerit, solitary confinement, and the use of the rod, as resorted to in well-regulated families. Personal chastisement shall only be inflicted for some high misdemeanor or repeated offense, and only on the order of the Superintendent; and in case of severe punishment, only in his presence or that of his Assistant.

These by-laws, or any part thereof, may be altered, amended, or repealed, at any regular meeting of the Board of Trustees.

Amended July 14, 1886.

VIEW FROM EAST.

CONNECTICUT INDUSTRIAL SCHOOL FOR GIRLS AT MIDDLETOWN.

ENTRANCE TO SCHOOL GROUNDS.

View from the North.

OFFICE AND CHAPEL.

Green House and Fessenden Hall

FARM HOUSE AND BARN.

COOKING SCHOOL

TWENTIETH AND TWENTY-FIRST

REPORTS

—OF THE—

BOARD OF DIRECTORS

—OF THE—

Connecticut

Industrial School for Girls.

Presented to the General Assembly at its Session in January, 1891.

MIDDLETOWN, CONN.:
PELTON & KING, PRINTERS AND BOOKBINDERS.
1890.

Board of Directors and Officers.

HENRY D. SMITH, *President*,	PLANTSVILLE.
CLARENCE E. BACON, *Secretary*,	MIDDLETOWN.
CHARLES F. BROWNING, *Treasurer*,	MIDDLETOWN.
CLARENCE E. BACON, *Attorney*,	MIDDLETOWN.

State Directors (ex-officio).

GOVERNOR MORGAN G. BULKELEY,	HARTFORD.
LIEUT.-GOVERNOR SAMUEL E. MERWIN,	NEW HAVEN.
SECRETARY OF STATE R. JAY WALSH,	GREENWICH.

Directors Elected.

WHOSE TERM OF OFFICE EXPIRES RESPECTIVELY IN

1891.

H. D. SMITH,	PLANTSVILLE.
SAMUEL E. MERWIN,	NEW HAVEN.
C. F. BROWNING,	MIDDLETOWN.
EDWARD PAYNE,	MIDDLETOWN.

1892.

JOHN M. VAN VLECK,	MIDDLETOWN.
CLARENCE E. BACON,	MIDDLETOWN.
LORRIN A. COOKE,	BARKHAMSTED.
STEPHEN O. BOWEN,	EASTFORD.

1893.

J. W. ALSOP,	MIDDLETOWN.
JOHN P. BARSTOW,	NORWICH.
MORRIS W. SEYMOUR,	BRIDGEPORT.
RODNEY DENNIS,	HARTFORD.

Executive Committee.

J. M. VAN VLECK, C. F. BROWNING,
J. W. ALSOP, CLARENCE E. BACON.
EDWARD PAYNE.

Visiting Committees of Ladies for Year 1890-91.

January and July.

MRS. J. H. BUNCE, - - - - - - - MIDDLETOWN.
MRS. L. L. CAMP, - - - - - - - NEW HAVEN.

February and August.

MISS HANNAH RIPLEY, - - - - - - - NORWICH.
MRS. WILLIAM H. SMITH, - - - - - NEW BRITAIN.

March and September.

MRS. CHARLES FITZGERALD, - - - - MIDDLETOWN.
MRS. JAMES LAWTON, - - - - - - MIDDLETOWN.

April and October.

MISS MARGARET S. HUBBARD, - - - - MIDDLETOWN.
MRS. JAMES T. DICKINSON, - - - - - MIDDLEFIELD.

May and November.

MRS. NELLIE DOUGLAS, - - - - - - MIDDLETOWN.
MRS. ALEXANDER HAWLEY, - - - - - BRIDGEPORT.

June and December.

MRS. WATSON WEBB, - - - - - - - HARTFORD.
MRS. ARTHUR F. EGGLESTON, - - - - - HARTFORD.

Resident Officers.

WILLIAM G. FAIRBANK, - - - - - - - *Superintendent.*
MARGARET E. FAIRBANK, *Visiting Agent and Assistant Superintendent.*
MISS C. B. SIMONDS, - - - - - - - - *Office Assistant.*

PRATT HOME.

MISS M. A. CUTLER, - - - - - - - - - - *Matron.*
MISS D. GOODELL, - - - - - - - - *Assistant Matron.*

STREET HOME.

MISS M. ROBINS, - - - - - - - - - - *Matron.*
MISS M. GIBSON, - - - - - - - - - *Assistant Matron.*

ALLYN HOME.

MRS. C. M. WILBUR, - - - - - - - - - *Matron.*
MISS O. GOODELL, - - - - - - - - *Assistant Matron.*

ROGERS HOME.

MISS H. HALL, - - - - - - - - - - *Matron.*
MISS M. P. BURBANK, - - - - - - - *Assistant Matron.*

RUSSELL HOME.

MRS. D. PARSONS, - - - - - - - - - - *Matron.*
MRS. HUDSON, - - - - - - - - - *Assistant Matron.*

MRS. S. ROGERS, - - - - - - *Assistant Matron, Farm House.*
MISS C. SPICER, - - - - - - - *Assistant Matron, Office.*

TEACHERS.

MRS. A. TITUS, - - - - - - - - - - *First School.*
MISS M. ALLEN, - - - - - - - - - - *Second School.*
MISS M. MILLER, - - - - - - - - - *Third School.*
MISS F. PERKINS, - - - - - - - - - *Fourth School.*
MISS V. WRIGHT, - - - - - - - - *Russell School.*
MISS M. ROBINSON, - - - - - - - - *Cooking School.*

SEWING DEPARTMENT.

MRS. M. ANDREWS.

PAPER BOX DEPARTMENT.

C. W. ATTENBOROUGH, MRS. C. W. ATTENBOROUGH.

FARM AND GARDEN.

MR. S. ROGERS, MR. D. ROGERS.

J. C. FORD, - - - - - - - - - - *Machinery and Repairs.*
R. JONES, - - - - - - - - - - - - *Watchman.*

STATEMENT RESPECTING

—THE—

Connecticut Industrial School for Girls.

LOCATION.

Its location is at Middletown, on the line of the Connecticut Valley, the Air Line, and the Middletown branch of the Hartford and New Haven Railroad. Communications relating to it should be addressed to the Superintendent at the School.

PROPER SUBJECTS.

The proper subjects are not *merely* paupers, nor orphans, nor confirmed thieves, nor prostitutes, nor other criminals, but *viciously inclined girls between the ages of 8 and 16 years.*

The class includes :

1. The stubborn and unruly, who refuse to obey those who have the proper charge of them.
2. Truants, vagrants, and beggars.
3. Those found in circumstances of manifest danger of falling into habits of vice and immorality.
4. Those who have committed any offense punishable by fine or imprisonment, or both, other than imprisonment for life.

The Official Report to the General Assembly, made in 1867, shows that there are from 300 to 500 in the State.

PECULIAR FEATURES.

1. It is *not a State institution, but a private charity*, incorporated and employed by the State for the custody, guardianship, discipline, and instruction of the aforenamed girls. The State, as the common parent and guardian of the community, treats them as minors and wards.

The School was founded by private charity, and is under the control of a self-perpetuating Board of Directors, originally chosen by the donors to its funds, together with three *ex-officio* State Officers.

For each girl committed to it by legal process, the State pays two dollars and seventy-five cents a week.

2. *Its design* is not that of a prison to which criminals are consigned for punishment, but that of a temporary place of custody and instruction. Its object is prevention and reformation, by giving to the children that special physical, mental, moral, social, and industrial training necessary to fit them for life, and which they cannot receive elsewhere, except in very rare cases. And *just so soon* as this is accomplished, and they can be placed in suitable circumstances elsewhere, their connection with the School ceases.

(See Report of the Commissioners of Inquiry to the General Assembly of 1867, and the Second Report of the School.)

The Supreme Court of Pennsylvania gave the following decision at the December term, 1828, as the unanimous opinion of the Court in full, consisting of Chief Justice Gibson and four Assistant Judges:

"*Per curiam.* The House of Refuge is not a prison, but a school where reformation, and not punishment, is the end. It may, indeed, be used as a prison for juvenile convicts, who would else be committed to a common jail; and in respect to these, the constitutionality of the act which incorporated it stands clear of controversy. It is only in respect of the application of its discipline to subjects admitted on the order of a court, a magistrate, *or the managers of the Almshouse*, that a doubt is entertained. The object of the charity is reformation, by training its inmates to industry, imbuing their minds with principles of morality and religion, by furnishing them with the means to earn a living, and, above all, by separating them from the corrupting influence of improper associates. To this end, may not the natural parents, *when unequal to the task of education, or unworthy of it*, be superseded by the *parens patriæ*, or common guardians of the community?

"It is to be remembered that the public has a paramount interest in the virtue and knowledge of its members, and that of strict right the business of education belongs to it. The parents are ordinarily entrusted with it because it can seldom be put into better hands; but *when they are incompetent or corrupt*, what is there to prevent the public from withdrawing the facilities, held, as they obviously are, at its sufferance?

"As to an abridgment of indefeasible rights by confinement of the person, it is no more than what is borne to a greater or less extent in every school, and we know of no natural right to exemption from restraints which conduce to an infant's welfare, nor is there a doubt of their application in this particular case.

The infant has been snatched from a course which must have ended in confirmed depravity; *and not only is the restraint lawful, but it would* be an act of extreme cruelty to release her from it."

A similar decision was made by the Supreme Court of Baltimore City in 1868, in which the decision of the Pennsylvania Court is quoted and endorsed in full.

3. *The form of Committal* is by a civil rather than a criminal process. Parents, guardians, selectmen, grand jurors, or *any proper officers* of the town where the girl is found, may present a written complaint to a Judge of Probate, or of the criminal or police court of any city or borough *sitting in chambers*, or to any Justice of the Peace of the town where the girl is found, who must thereupon take cognizance and determine the case.

The form of Commitment reads: "To the guardianship and control of the institution till she is 21, unless sooner discharged according to law." Any two of the Directors may discharge a girl for sufficient reasons, or bind her to service, still retaining the right of control prescribed by law.

4. *The system of discipline and education* is specially adapted to the conditions and wants of the girls. It aims to be as nearly as possible that of a well-regulated Christian family. Its culture is physical, sanitary, educational, industrial, and truly Christian, but not sectarian.

5. *Its History.* It was incorporated in 1868, received its first inmates January, 1870, was formally opened the 30th of June following, and two Homes were occupied in October.

6. *Its present condition* is in the highest degree prosperous and encouraging. It has a beautifully located, well cultivated and stocked farm, five large Family Houses, designed for 200 inmates. It has a school building containing four rooms and a chapel hall, a box factory, a Superintendent's and Farmer's house, two barns, and other valuable buildings. It has a full and well-organized board of teachers and officers. One hundred and twenty-six different towns in the State have committed girls to its care. The discipline has generally proved salutary and successful.

Other particulars are given in the present and previous reports.

List of Directors of the School

SINCE ITS ORGANIZATION.

DIRECTORS.

Names.		Terms of Service.	
T. M. Allyn,	Hartford,	Elected, 1868.	Died in office, 1882.
Charles Fabrique,	New Haven,	" 1868.	Died in office, 1889.
E. W. Hatch,	Meriden,	" 1868.	Died in office, 1874.
H. D. Smith,	Plantsville,	" 1868.	Still in office.
George Beach,	Hartford,	" 1868.	Retired in 1877.
T. K. Fessenden,	Farmington,	" 1868.	Retired in 1883.
James E. English,	New Haven,	" 1869.	Retired in 1884.
Samuel C. Hubbard,	Middletown,	" 1869.	Retired in 1878.
Samuel Babcock,	Middletown,	" 1869.	Retired in 1872.
Samuel Russell,	Middletown,	" 1872.	Retired in 1881.
O. Vincent Coffin,	Middletown,	" 1873.	Retired in 1874.
John M. Van Vleck,	Middletown,	" 1873.	Still in office.
Frederic Gardiner,	Middletown,	" 1874.	Retired in 1883.
Charles F. Browning,	Middletown,	" 1875.	Still in office.
E. K. Hunt,	Hartford,	" 1877.	Retired in 1884.
W. W. Wilcox,	Middletown,	" 1878.	Retired in 1884.
J. W. Alsop,	Middletown,	" 1881.	Still in office.
John C. Parsons,	Hartford,	" 1882.	Retired in 1884.
Clarence E. Bacon,	Middletown,	" 1883.	Still in office.
J. P. Barstow,	Norwich,	" 1883.	Still in office.
Lorrin A. Cooke,	Barkhamsted,	" 1884.	Still in office.
A. C. Denison,	Middlefield,	" 1884.	Died in office, 1890.
Edward Payne,	Middletown,	" 1884.	Still in office.
Rodney Dennis,	Hartford,	" 1884.	Still in office.
S. E. Merwin,	New Haven,	" 1890.	Still in office.
Morris W. Seymour,	Bridgeport,	" 1890.	Still in office.
Stephen O. Bowen,	Eastford,	" 1890.	Still in office.

SUPERINTENDENTS.

James H. Bradford, - - - - -	Appointed,	Sept. 3, 1869.
James H. Eastman *(pro tem.)*, - - -	"	Sept. 2, 1873.
S. N. Rockwell, - - - - - -	"	March 4, 1874.
Mary E. Rockwell *(Assistant)*, - - -	"	March 4, 1874.
Charles H. Bond, - - - - - -	"	Dec. 5, 1877.
Lydia M. Bond *(Assistant)*, - - - -	"	Dec. 5, 1877.
William G. Fairbank, - - - - -	"	Sept. 6, 1886.
Margaret E. Fairbank *(Assistant)*, - -	"	Sept. 6, 1886.

DIRECTORS' REPORT.

To the Honorable the General Assembly of the State of Connecticut, January Session, 1891:

The Directors of the Connecticut Industrial School for Girls hereby respectfully present their Report for the two years ending June 30, 1890, being the Twentieth and Twenty-first years of the existence of the School.

Number of girls in the School July 1, 1888,	215
Number received during the last two years,	290
Whole number under care during the last two years,	505
Number placed out during the last two years,	287
Present number, July 1, 1890,	218
Whole number received since the opening of the School, January 1, 1870,	940
*Whole number placed out,	1325
Number of towns from which girls are sent,	126

*These figures include girls who have been dismissed and returned several times.

The design of the Industrial School is the proper education of unfortunate, wayward and homeless girls in the studies pursued in the common schools; to give such moral and religious training as shall induce them to form a good character, and such training in domestic work as will enable them to readily find employment in good families, and thereby secure good homes, which good service always commands.

The School is conducted on the Family System, as distinguished from the congregate.

The homes are each designed to accommodate about forty girls.

A matron and assistants are in charge of each home, and it is the purpose of the Directors that in each home the girls shall receive that careful oversight and kind treatment which should always come to the child in a well-ordered Christian household.

Most of the girls come to us with little or no knowledge of books; we aim, therefore, to give them the best opportunities for a common school education that are at our command.

Our Superintendent, being a practical teacher himself, has infused much of his own energy into the different departments of the School, and made them more efficient each year.

The teachers are doing good work in the branches taught, and are exerting a good moral influence over their pupils, thus helping them to a useful life.

One very important addition to the home training of the girls made during the year 1889, is teaching them the art of cooking. In addition to the practice they receive in the School homes, each girl before she leaves the institution takes a practical course in cooking, under a qualified teacher, and this thorough knowledge in such an important branch of household education, makes their services very acceptable in the families to which they go.

For further information on this topic, the other industries taught the girls, the religious education of the girls in the Homes, and instruction on the Sabbath, we refer to the report of the Superintendent herewith presented.

We wish to emphasize the usefulness and saving influence of the work of our Visiting Agent in visiting the girls at the Homes in which they are placed out from the Industrial School. Mrs. Fairbank, the Assistant Superintendent, is also the Visiting Agent by appointment. She is in correspondence with every girl placed out, and with the families in which they live. She visits each girl at her home, to know the treatment she receives, whether kindly or otherwise, and to learn the nature, the quality, and the value of the service she renders. These visits are timely and very useful to the girls, for most of them know of no home worth the mention but the Industrial School; and the kindly visits they receive from Mrs. Fairbank are like the visits of a mother.

We would call particular attention to the accompanying report of the Visiting Agent.

The sad event we have to recall of the last year is the death, in April, 1889, of our beloved and honored friend, Mr. Charles Fabrique. He was a corporate member of the Board of Directors, and in active service twenty-one years, and since 1883 President of the Board.

The Girls' Industrial School is the conception of his brain.

Engaged for most of a lifetime in the education of the young, he saw clearly the great need of the Industrial School for the homeless, unfortunate, and wayward girls of the State, and gave the last years of his life to the detail of organizing and perfecting the School.

This Board is indebted to him for many wise suggestions for the conduct of the School, and the State owes him a debt of gratitude for years of unselfish labor for the best interests of its wards, in and out of the School.

We have also to record the death of another corporate member of the Board of Directors, the Hon. James E. English, who died in March of the present year.

By his invitation, a meeting of eminent gentlemen from different parts of the State was convened at the Governor's room in New Haven, and out of their deliberations came "The Connecticut Industrial School for Girls."

He was one of the earliest and strongest friends of the School, and gave the full weight of his great influence when Governor of the State for the founding of the institution.

As a member of the Board, his counsel was of great value, especially in the stormy days of the School's early life.

We take pleasure in recognizing the faithful and remarkably efficient work being accomplished by Superintendent Fairbank, Mrs. Fairbank, his able assistant, and their subordinates.

In conclusion, we think it evident from the statistics submitted in the accompanying reports, showing the grand reformatory and saving work being done, that the highest and best hopes of the founders, benefactors, and friends of the institution are being realized.

HENRY D. SMITH,
JOHN M. VAN VLECK,
CHARLES F. BROWNING,
J. W. ALSOP,
CLARENCE E. BACON,
J. P. BARSTOW,
LORRIN A. COOKE,
EDWARD PAYNE,
RODNEY DENNIS,
SAMUEL E. MERWIN.

SUPERINTENDENT'S REPORT.

To the Directors of the Connecticut
Industrial School for Girls:

GENTLEMEN: I respectfully submit my report for the fiscal year ending June 30, 1889.

The following tables include the statistics for the past twelve months, and for the previous years of the school:

TABLE I.

NUMBER FROM THE BEGINNING.

Girls received since January 1st, 1870,		895
Dismissed since January 1, 1870,	1179	
Of these were returned,	507	
Remaining out,		672
Number in school July 1, 1889,		223

TABLE II.

NUMBER DURING PAST YEAR.

In school July 1st, 1888,	215	
Received during the year,	149	
Whole number under care during the year,		364
Placed out during year,		141
Remaining July 1, 1889,		223

TABLE III.

NUMBERS RECEIVED EACH MONTH, INCLUDING BOTH COMMITMENTS AND RETURNS.

MONTH.	Past Year.	Previously.	Total.
July, 1888, - - - -	12	115	127
August, " - - - -	12	98	110
September, " - - - -	7	105	112
October, " - - - -	10	118	128
November, " - - - -	12	100	112
December, " - - - -	15	86	101
January, 1889, - - - -	12	90	102
February, " - - - -	14	95	109
March, " - - - -	17	103	120
April, " - - - -	17	101	118
May, " - - - -	10	117	127
June, " - - - -	11	131	142
Total, - - - - -	149	1259	1408

TABLE IV.

TOWNS FROM WHICH GIRLS WERE COMMITTED.

TOWNS.	Past Year.	Previously.	Total.
Andover, - - - - -	—	1	1
Avon, - - - - - -	—	1	1
Barkhamsted, - - - -	—	4	4
Berlin, - - - - -	—	7	7
Bethel, - - - - -	—	3	3
Bozrah, - - - - -	—	1	1
Branford, - - - - -	1	6	7
Bridgeport, - - - - -	4	40	44
Bridgewater, - - - -	—	1	1
Bristol, - - - - -	—	5	5
Brookfield, - - - - -	—	1	1
Brooklyn, - - - - -	—	5	5
Bethany, - - - - -	—	3	3
Burlington, - - - - -	—	5	5
Birmingham, - - - -	—	1	1
Canaan, - - - - -	—	1	1
Chatham, - - - - -	—	4	4
Cheshire, - - - - -	—	5	5
Chester, - - - - -	—	1	1
Clinton, - - - - -	—	1	1
Colchester, - - - - -	—	8	8
Cornwall, - - - - -	—	1	1
Coventry, - - - - -	—	1	1
Carried forward, - - -	5	106	111

TABLE IV.—Continued.

TOWNS.	Past Year.	Previously.	Total.
Brought forward,	5	106	111
Cromwell,	—	1	1
Danbury,	—	12	12
Darien,	—	1	1
Derby,	2	8	10
Durham,	—	2	2
Danielsonville,	—	1	1
Eastford,	2	3	5
East Hartford,	—	1	1
East Haven,	—	7	7
Enfield,	1	2	3
Essex,	—	5	5
Fairfield,	—	1	1
Farmington,	1	7	8
Glastonbury,	—	3	3
Granby,	—	3	3
Greenwich,	1	3	4
Griswold,	—	2	2
Groton,	—	3	3
Guilford,	—	3	3
Haddam,	1	6	7
Hadlyme,	—	1	1
Hartford,	1	138	139
Hebron,	—	1	1
Huntington,	3	4	7
Kent,	—	3	3
Killingly,	2	8	10
Killingworth,	—	2	2
Litchfield,	—	3	3
Lyme,	—	3	3
Manchester,	—	2	2
Meriden,	—	22	22
Middlebury,	1	1	2
Middletown,	—	21	21
Milford,	—	3	3
Monroe,	—	2	2
Montville,	—	6	6
Naugatuck,	1	2	3
New Britain,	—	20	20
New Canaan,	—	2	2
New Haven,	7	188	195
New London,	—	12	12
New Milford,	—	3	3
New Hartford,	2	2	4
Newtown,	1	5	6
Norfolk,	—	2	2
North Haven,	2	2	4
North Manchester,	—	2	2
North Stonington,	—	2	2
Newington,	—	1	1
Norwalk,	—	12	12
Carried forward,	33	655	688

TABLE IV.—Continued.

TOWNS.	Past Year.	Previously.	Total.
Brought forward,	33	655	688
Norwich,	—	27	27
New Fairfield,	—	1	1
Old Lyme,	—	1	1
Old Saybrook,	—	1	1
Orange,	—	4	4
Oxford,	—	5	5
Plainfield,	—	2	2
Plantsville	—	2	2
Plymouth,	—	5	5
Portland,	—	1	1
Plainville,	—	2	2
Preston,	1	3	4
Putnam,	—	8	8
Pomfret,	—	2	2
Ridgefield,	1	4	5
Salisbury,	—	3	3
Saybrook,	—	5	5
Seymour,	—	1	1
Sharon,	—	6	6
Sherman,	—	1	1
Simsbury,	—	1	1
Southbury,	—	1	1
Southington,	—	9	9
Southport,	—	1	1
Stafford,	—	5	5
Stamford,	—	11	11
Stonington,	—	7	7
Stratford,	2	8	10
Thomaston,	—	1	1
Thompson,	—	2	2
Torrington,	—	1	1
Trumbull,	—	1	1
Tolland,	—	2	2
Vernon,	—	9	9
Wallingford,	—	7	7
Washington,	—	2	2
Waterbury,	2	19	21
Waterford,	—	1	1
West Hartford,	—	1	1
Weston,	—	3	3
Westport,	—	1	1
Wethersfield,	—	4	4
Willimantic,	—	2	2
Wilton,	—	1	1
Winchester,	—	3	3
Windham,	—	7	7
Windsor,	—	1	1
Windsor Locks,	1	1	2
Woodbury,	—	3	3
Claremont, N. H.,	—	1	1
Total,	40	855	895

TABLE V.

AGES OF GIRLS COMMITTED.

AGES.	Past Year.	Previously.	Total.
Seven years, (private boarder), -	—	1	1
Eight " - - - -	1	52	53
Nine " - - - -	1	46	47
Ten " - - - -	4	46	50
Eleven " - - - -	6	89	95
Twelve " - - - -	6	104	110
Thirteen " - - - -	7	120	127
Fourteen " - - - -	4	187	191
Fifteen " - - - -	10	202	212
Sixteen " - - - -	—	3	3
Seventeen " - - - -	—	2	2
Eighteen " - - - -	—	1	1
Unknown, - - - - -	1	2	3
Total, - - - - -	40	855	895

TABLE VI.

NATIVITY OF GIRLS COMMITTED.

	Past Year.	Previously.	Total.
Connecticut, - - - -	34	647	681
Massachusetts, - - - -	—	25	25
Maine, - - - - -	—	2	2
Rhode Island, - - - -	—	10	10
Vermont, - - - - -	—	4	4
New Hampshire, - - - -	—	4	4
New York, - - - - -	3	58	61
New Jersey, - - - - -	1	6	7
Pennsylvania, - - - -	—	10	10
Maryland, - - - - -	—	2	2
Virginia, - - - - -	—	5	5
Tennessee, - - - - -	—	2	2
Georgia, - - - - -	—	1	1
Louisiana, - - - - -	—	2	2
Ohio, - - - - - -	—	3	3
North Carolina, - - - -	—	3	3
South Carolina, - - - -	—	2	2
Illinois, - - - - -	—	1	1
Missouri, - - - - -	—	1	1
Wisconsin, - - - - -	—	1	1
Canada, - - - - -	—	8	8
District of Columbia, - - -	—	3	3
England, - - - - -	1	11	12
Ireland, - - - - -	—	21	21
Italy, - - - - - -	—	1	1
Scotland, - - - - -	1	7	8
Germany, - - - - -	—	7	7
Labrador, - - - - -	—	1	1
Nova Scotia, - - - -	—	1	1
Unknown, - - - - -	—	6	6
Total, - - - - -	40	855	895

TABLE VII.

PARENTAGE OF GIRLS COMMITTED.

PARENTS.	Past Year.	Previously.	Total.
American, white,	17	387	404
American, colored,	4	111	115
English,	2	25	27
French,	—	6	6
German,	1	35	36
Irish,	10	202	212
Irish and English,	—	9	9
Irish and American,	3	34	37
Scotch,	1	10	11
Scotch and Canadian,	—	1	1
French Canadian,	—	9	9
German and American,	—	4	4
English and American,	—	7	7
English and German,	—	1	1
Swiss,	—	1	1
Swiss and American,	—	1	1
French and American,	2	2	4
German and Irish,	—	1	1
Irish and Canadian,	—	1	1
Italian,	—	1	1
Scotch and Irish,	—	3	3
Unknown,	—	4	4
Total,	40	855	895

TABLE VIII.

NUMBER DISMISSED EACH MONTH.

MONTH.	Past Year.	Previously.	Total.
July,	9	87	96
August,	17	108	125
September,	17	97	114
October,	16	96	112
November,	11	80	91
December,	6	67	73
January,	16	61	77
February,	7	52	59
March,	14	117	131
April,	13	90	103
May,	6	95	101
June,	9	88	97
Total,	141	1038	1179

TABLE IX.

CAUSE OF DISMISSAL.

CAUSE.	Past Year.	Previously.	Total.
Expiration of minority,	1	42	43
Placed out in families,	114	749	863
Placed out with relatives,	16	181	197
Found unfit subjects,	2	25	27
Ordered to new trial,	—	4	4
Escaped,	—	4	4
Death,	5	17	22
Placed in hospital,	3	9	12
Remain as assistants,	—	7	7
Total,	141	1038	1179

TIME TABLE.

From April 15th to October 15th, Kitchen girls rise at	5	o'clock,	A. M.
Rising Bell,	5:30	"	"
Officers and Girls Breakfast,	6	"	"
Prayers,	6:25	"	"
Sweeping, hall work, making beds, etc.,	6:40	"	"
Work (all departments),	7	"	"
Recess,	9:15	"	"
Work,	9:30	"	"
Recess,	11:45	"	"
Dinner,	12	"	M.
Recess,	12:30	"	P. M.
Dressing Bell,	1	"	"
Line for School,	1:20	"	"
Recess,	3:25	"	"
School closes,	5:40	"	"
Recess,	5:40	"	"
Supper,	6	"	"
Recess,	6:25	"	"
Pass to Chapel for Prayers,	7:10	"	"

From October 15th to April 15th, the Bell for Rising and Breakfast will ring a half hour later than the above.

Account of Expenditures.

Salaries and Wages,	$9,494 56
Furniture and Fixtures,	608 40
Fuel and Light,	1,673 87
Dry Goods and Clothing,	2,573 24
Books, Stationery and Postage,	313 38
Provisions and Groceries,	3,233 34
Fish, Meat, &c.,	2,014 04
Flour and Meal,	2,341 58
Farm, Garden, &c.,	1,910 49
Construction and Repairs,	11,427 82
Drugs, Medicines and Medical Attendance,	530 82
Insurance,	751 40
New Office,	772 28
Steam Heating and Electric Appliances,	866 11
Miscellaneous,	1,427 79
Paper Box Factory,	4,078 77
	$44,017 89
Cash on hand July 1, 1888,	5 93
	$44,011 96
Cash on hand July 1, 1889,	1 24
	$44,013 20

Middletown, Conn., Aug. 15, 1889.

This will certify that we have examined the accounts of W. G. Fairbank, Superintendent of the Connecticut Industrial School for Girls, compared the vouchers therewith, and find the same correct, showing a balance in his hands amounting to one and twenty-four one hundredth dollars ($1.24).

Frank L. Rogers, } *Auditors of*
W. Cecil Durand, } *Public Accounts.*

PAPER BOX FACTORY.

IN ACCOUNT WITH CONNECTICUT INDUSTRIAL SCHOOL FOR GIRLS.

Debtor.

To stock on hand July 1, 1888,	$1,882 24	
To bills and salaries paid from July 1, 1888, to July 1, 1889,	4,078 77	
To bill of straw board to be paid,	332 25	
Net earnings for the year,	2,551 11	
		$8,844 37

Credit.

By receipts from sale of boxes from July 1, 1888, to July 1, 1889,	$7,831 80	
Finished work July 1, 1889,	339 82	
Stock on hand July 1, 1889,	672 75	
		$8,844 37

DONATIONS.

August, 1888.—Edward Payne, city, large lot papers.

September.—L. R. Hazen, city, 16 copies Youth's Companion.

Murray Closson, city, 25 copies Youth's Palladium.

October.—Murray Closson, city, 25 copies Youth's Palladium.

November.—Mrs. J. W. Tuck, city, large lot of papers.

December.—Coles & Weeks, city, Christmas, $5.

H. Bernhard, city, 7 bottles perfumery, 3 dozen handkerchiefs, 12 pen-wipers and thimbles, 10 scrap-books, 12 scholars' companions, 8 yards ribbon.

Mrs. W. H. Smith, New Britain, 15 books.

Morgan Street Sunday School, Hartford, Century, Harper's Magazine, St. Nicholas, and Youth's Companion, for the year.

Mrs. Dickinson, Middlefield, 16 small books.

Mrs. W. W. Wilcox, city, 45 Christmas cards, 15 children's books, 10 large books, 4 sets building blocks, 2 boxes of games.

James H. Bunce, city, 7 sachet bags, 2 pin-cushions, 12 sets crochet hooks, 6 card receivers, 10 baskets, 12 plush boxes, 7 shell pin balls, 6 pocket-books, 6 match safes, 12 bottles cologne, 1 basket pin-cushion, 13 vases.

L. R. Hazen, city, 400 booklets, books, etc.

March, 1889.—Murray Closson, city, 10 copies Youth's Palladium.

April.—O. N. Miller, Middlefield, lot of leaflets.

May.—Murray Closson, city, lot Youth's Palladium.

L. R. Hazen, city, 25 copies Harper's Young People.

Mrs. W. N. Rice, city, large lot Independents.

The following papers have been regularly sent to the School, free of charge: Daily Courant, Hartford; Evening Post, Hartford; Weekly Times, Hartford; The Constitution, Middletown, five copies; Sentinel and Witness, Middletown; Daily Penny Press, Middletown; Daily Herald, Middletown; Daily Journal, Middletown; Norwich Record, daily, Norwich; Christian Secretary, Hartford; Temperance Banner; Good Health, Battle Creek, Mich.; The Howard Times, R. I.; The Summary, Elmira, N. Y.; Traveler's Record, Hartford; The Delaware County Advocate, Pa.; The Advance, Jamesburg, N. J,; Lyman School Enterprise, Westboro', Mass.

Farm Report.

Farm Products Furnished to School from July 1st, 1888, to July 1st, 1889.

Apples,	25	barrels,	$50 00
Beets,	75	bushels,	45 00
Beans,	16	"	16 00
Butter,	1,248	pounds,	312 00
Cherries,	100	quarts,	10 00
Corn (sweet),	25	bushels,	25 00
Corn,	142	"	92 30
Cucumbers,	16	"	32 00
Cabbage,	3,000	heads,	180 00
Eggs,	380	dozen,	95 00
Grapes,	250	pounds,	12 50
Ice,	125	tons,	375 00
Lettuce,	2,500	heads,	75 00
Milk,	23,105	quarts,	924 20
Onions,	1½	bushels,	1 20
Potatoes (large),	718	"	287 20
Potatoes (small),	103	"	25 75
Pears,	10	"	10 00
Peas,	6	"	6 00
Pie Plant,	1,000	pounds,	30 00
Raspberries,	218	quarts,	21 80
Squashes (summer),	1,000	-	30 00
Squashes (winter),	4	tons,	100 00
Turnips,	211	bushels	63 30
Tomatoes,	40	"	24 00
Hay,	40	tons,	720 00
Oats,	8	tons,	144 00

Meat Consumed.

Veal,	258	pounds at 12c.,	-	$30 96
Pork,	1,814	" " 7c.,	-	126 98

The Live Stock consists of:

4	Horses,	$500 00
15	Cows,	600 00
2	Calves,	20 00
8	Hogs,	120 00
200	Hens and Chickens,	150 00

TREASURER'S REPORT.

From June 30th, 1888, to July 1st, 1889.

RECEIPTS.

Balance, June 30th, 1888,	$2 21
From State for board of girls,	35,731 35
From sale of boxes,	7,831 80
From donations, including rent of house,	198 00
From dry goods sold,	3 20
From farm sales,	98 13
From coal sold,	98 22
From rags sold,	13 86
From laundry,	88 30
From boiler sold,	80 00
From private board,	33 00
From photographs sold,	26 55
From lumber returned,	43 08
From use of telephone,	15
Total receipts,	$44,247 85

EXPENDITURES.

Paid 453 orders of Executive Committee,	$41,456 65	
Paid 7 notes amounting to	2,556 55	
Total expenditures,		$44,013 20
Balance in Treasury July 1st, 1889,		234 65

Respectfully submitted,

C. F. BROWNING, *Treasurer.*

This will certify that we have examined the accounts of Charles F. Browning, Treasurer of the Connecticut Industrial School for Girls, for the fiscal year ending June 30th, 1889, compared the vouchers therewith, and found the same correct, showing a balance in the hands of the Treasurer amounting to two hundred and thirty-four and sixty-five one-hundredth dollars ($234.65).

FRANK L. ROGERS, } *Auditors of*
W. CECIL DURAND, } *Public Accounts.*

Superintendent's Report.

To the Directors of the Connecticut
Industrial School for Girls:

Gentlemen: I herewith respectfully submit the Twenty-first Annual Report of this institution.

The following tables include the statistics for the past twelve months, and for the previous years of the school:

TABLE I.

NUMBER FROM THE BEGINNING.

Girls received since January 1st, 1870,		940
Dismissed since January 1, 1870,	1325	
Of these were returned,	603	
Remaining out,		722
Number in school July 1, 1890,		218

TABLE II.

NUMBER DURING PAST YEAR.

In school July 1st, 1889,	223	
Received during the year,	141	
Whole number under care during the year,		364
Placed out during year,		146
Remaining July 1, 1890,		218

TABLE III.

NUMBERS RECEIVED EACH MONTH, INCLUDING BOTH COMMITMENTS AND RETURNS.

MONTH.	Past Year.	Previously.	Total.
July, 1889,	10	127	137
August, "	17	110	127
September, "	15	112	127
October, "	5	128	133
November, "	10	112	122
December, "	9	101	110
January, 1890,	20	102	122
February, "	9	109	118
March, "	3	120	123
April, "	13	118	131
May, "	16	127	143
June, "	14	142	156
Total,	141	1408	1549

TABLE IV.

TOWNS FROM WHICH GIRLS WERE COMMITTED.

TOWNS.	Past Year.	Previously.	Total.
Andover,	—	1	1
Avon,	—	1	1
Ansonia,	2	—	2
Barkhamsted,	1	4	5
Berlin,	—	7	7
Bethel,	—	3	3
Bozrah,	—	1	1
Branford,	—	7	7
Bridgeport,	8	44	52
Bridgewater,	—	1	1
Bristol,	—	5	5
Brookfield,	—	1	1
Brooklyn,	—	5	5
Bethany,	—	3	3
Burlington,	—	5	5
Birmingham,	—	1	1
Canaan,	—	1	1
Chatham,	—	4	4
Cheshire,	—	5	5
Chester,	—	1	1
Clinton,	—	1	1
Colchester,	—	8	8
Cornwall,	—	1	1
Coventry,	—	1	1
Carried forward,	11	111	122

TABLE IV.—Continued.

TOWNS.	Past Year.	Previously.	Total.
Brought forward, - - -	11	111	122
Cromwell, - - - - - -	—	1	1
Danbury, - - - - - -	—	12	12
Darien, - - - - - -	—	1	1
Derby, - - - - - - -	—	10	10
Durham, - - - - - -	1	2	3
Danielsonville, - - - - -	—	1	1
Easton, - - - - - -	1	—	1
Eastford, - - - - - -	—	5	5
East Hartford, - - - - -	—	1	1
East Haven, - - - - -	—	7	7
Enfield, - - - - - -	1	3	4
Essex, - - - - - - -	—	5	5
Fairfield, - - - - - -	—	1	1
Farmington, - - - - -	1	8	9
Glastonbury, - - - - -	1	3	4
Granby, - - - - - -	—	3	3
Greenwich, - - - - - -	—	4	4
Griswold, - - - - - -	1	2	3
Groton, - - - - - -	—	3	3
Guilford, - - - - - -	—	3	3
Haddam, - - - - - -	—	7	7
Hadlyme, - - - - - -	—	1	1
Hartford, - - - - - -	3	139	142
Hebron, - - - - - -	1	1	2
Huntington, - - - - -	—	7	7
Kent, - - - - - - -	—	3	3
Killingly, - - - - - -	—	10	10
Killingworth, - - - - -	—	2	2
Litchfield, - - - - - -	—	3	3
Lyme, - - - - - - -	—	3	3
Manchester, - - - - -	—	2	2
Meriden, - - - - - -	1	22	23
Middlebury, - - - - -	—	2	2
Middletown, - - - - -	1	21	22
Milford, - - - - - -	—	3	3
Monroe, - - - - - -	—	2	2
Montville, - - - - - -	1	6	7
Naugatuck, - - - - - -	—	3	3
New Britain, - - - - -	—	20	20
New Haven, - - - - -	7	195	202
New Canaan, - - - - -	—	2	2
New London, - - - - -	—	12	12
New Milford, - - - - -	1	3	4
New Hartford, - - - - -	—	4	4
Newtown, - - - - - -	—	6	6
Norfolk, - - - - - -	—	2	2
North Haven, - - - - -	—	4	4
North Manchester, - - - -	—	2	2
North Stonington, - - - -	—	2	2
Newington, - - - - - -	—	1	1
Norwalk, - - - - - -	—	12	12
Carried forward, - - -	32	688	720

TABLE IV.—Continued.

TOWNS.	Past Year.	Previously.	Total.
Brought forward,	32	688	720
Norwich,	1	27	28
New Fairfield,	—	1	1
Old Lyme,	—	1	1
Old Saybrook,	—	1	1
Orange,	—	4	4
Oxford,	—	5	5
Plainfield,	—	2	2
Plantsville	—	2	2
Plymouth,	—	5	5
Portland,	—	1	1
Plainville,	—	2	2
Preston,	—	4	4
Putnam,	—	8	8
Pomfret,	—	2	2
Ridgefield,	—	5	5
South Britain,	1	—	1
Salisbury,	—	3	3
Saybrook,	—	5	5
Seymour,	1	1	2
Sharon,	—	6	6
Sherman,	—	1	1
Simsbury,	—	1	1
Southbury,	—	1	1
Southington,	—	9	9
Southport,	—	1	1
Stafford,	1	5	6
Stamford,	—	11	11
Stonington,	—	7	7
Stratford,	—	10	10
Thomaston,	1	1	2
Thompson,	1	2	3
Torrington,	—	1	1
Trumbull,	—	1	1
Tolland,	—	2	2
Vernon,	—	9	9
Wallingford,	1	7	8
Washington,	—	2	2
Waterbury,	3	21	24
Waterford,	—	1	1
West Hartford,	—	1	1
Weston,	—	3	3
Westport,	1	1	2
Wethersfield,	—	4	4
Willimantic,	—	2	2
Wilton,	—	1	1
Winchester,	1	3	4
Windham,	—	7	7
Windsor,	—	1	1
Windsor Locks,	1	2	3
Woodbury,	—	3	3
Claremont, N. H.,	—	1	1
Total,	45	895	940

TABLE V.

AGES OF GIRLS COMMITTED.

AGES.	Past Year.	Previously.	Total.
Seven years, (private boarder), -	—	1	1
Eight " - - - - -	—	53	53
Nine " - - - - -	2	47	49
Ten " - - - - -	3	50	53
Eleven " - - - - -	1	95	96
Twelve " - - - - -	5	110	115
Thirteen " - - - - -	9	127	136
Fourteen " - - - - -	10	191	201
Fifteen " - - - - -	15	212	227
Sixteen " - - - - -	—	3	3
Seventeen " - - - - -	—	2	2
Eighteen " - - - - -	—	1	1
Unknown, - - - - - -	—	3	3
Total, - - - - - -	45	895	940

TABLE VI.

NATIVITY OF GIRLS COMMITTED.

	Past Year.	Previously.	Total.
Connecticut, - - - - -	34	681	715
Massachusetts, - - - - -	3	25	28
Maine, - - - - - -	1	2	3
Rhode Island, - - - - -	—	10	10
Vermont, - - - - - -	—	4	4
New Hampshire, - - - - -	—	4	4
New York, - - - - - -	—	61	61
New Jersey, - - - - - -	—	7	7
Pennsylvania, - - - - -	—	10	10
Maryland, - - - - - -	—	2	2
Virginia, - - - - - -	1	5	6
Tennessee, - - - - - -	—	2	2
Georgia, - - - - - -	—	1	1
Louisiana, - - - - - -	—	2	2
Ohio, - - - - - - -	—	3	3
North Carolina, - - - - -	1	3	4
South Carolina, - - - - -	—	2	2
Illinois, - - - - - -	—	1	1
Missouri, - - - - - -	—	1	1
Wisconsin, - - - - - -	—	1	1
Canada, - - - - - -	1	8	9
District of Columbia, - - - -	—	3	3
England, - - - - - -	1	12	13
Ireland, - - - - - -	2	21	23
Italy, - - - - - - -	—	1	1
Scotland, - - - - - -	—	8	8
Germany, - - - - - -	—	7	7
Labrador, - - - - - -	—	1	1
Nova Scotia, - - - - -	—	1	1
Switzerland, - - - - -	1	—	1
Unknown, - - - - - -	—	6	6
Total, - - - - - -	45	895	940

TABLE VII.

PARENTAGE OF GIRLS COMMITTED.

PARENTS.	Past Year.	Previously.	Total.
American, white,	16	404	420
American, colored,	7	115	122
English,	1	27	28
French,	1	6	7
German,	6	36	42
Irish,	10	212	222
Irish and English,	—	9	9
Irish and American,	—	37	37
Scotch,	1	11	12
Scotch and Canadian,	—	1	1
French Canadian,	—	9	9
German and American,	1	4	5
English and American,	—	7	7
Swiss,	—	1	1
Swiss and American,	—	1	1
French and American,	—	4	4
German and Irish,	—	1	1
Irish and Canadian,	—	1	1
Italian,	1	1	2
Scotch and Irish,	—	3	3
Indian and American,	1	—	1
English and German,	—	1	1
Unknown,	—	4	4
Total,	45	895	940

TABLE VIII.

NUMBER DISMISSED EACH MONTH.

MONTH.	Past Year.	Previously.	Total.
July,	17	96	113
August,	11	125	136
September,	17	114	131
October,	7	112	119
November,	9	91	100
December,	12	73	85
January,	16	77	93
February,	11	59	70
March,	8	131	139
April,	13	103	116
May,	12	101	113
June,	13	97	110
Total,	146	1179	1325

TABLE IX.

CAUSE OF DISMISSAL.

CAUSE.	Past Year.	Previously.	Total.
Expiration of minority,	2	43	45
Placed out in families,	110	863	973
Placed out with relatives,	31	197	228
Found unfit subjects,	—	27	27
Ordered to new trial,	—	4	4
Escaped,	—	4	4
Death,	1	22	23
Placed in hospital,	2	12	14
Remain as assistants,	—	7	7
Total,	146	1179	1325

TIME TABLE.

From April 15th to October 15th, Kitchen girls rise at	5	o'clock,	A. M.
Rising Bell,	5:30	"	"
Officers and Girls Breakfast,	6	"	"
Prayers,	6:25	"	"
Sweeping, hall work, making beds, etc.,	6:40	"	"
Work (all departments),	7	"	"
Recess,	9:15	"	"
Work,	9:30	"	"
Recess,	11:45	"	"
Dinner,	12	"	M.
Recess,	12:30	"	P. M.
Dressing Bell,	1	"	"
Line for School,	1:20	"	"
Recess,	3:25	"	"
School closes,	5:40	"	"
Recess,	5:40	"	"
Supper,	6	"	"
Recess,	6:25	"	"
Pass to Chapel for Prayers,	7:10	"	"

From October 15th to April 15th, the Bell for Rising and Breakfast will ring a half hour later than the above.

Account of Expenditures.

Salaries and Wages,	$9,580 91
Furniture and Fixtures,	650 12
Fuel and Light,	2,897 41
Dry Goods and Clothing,	3,090 30
Books, Stationery and Postage,	379 40
Provisions and Groceries,	4,350 76
Fish, Meat, &c.,	2,088 75
Flour and Meal,	2,435 23
Farm, Garden, &c.,	1,990 05
Construction and Repairs,	9,728 64
Drugs, Medicines and Medical Attendance,	654 37
Miscellaneous,	1,454 67
Paper Box Factory,	6,656 70
	$45,957 31
Cash on hand July 1, 1889,	1 24
	$45,956 07
Cash on hand July 1, 1890,	14 09
	$45,970 16

Middletown, Conn., Aug. 28, 1890.

This will certify that we have examined the accounts of W. G. Fairbank, Superintendent of the Connecticut Industrial School for Girls, for the fiscal year ending June 30, 1890, compared the vouchers therewith, and find the same correct, showing a balance in said Superintendent's hands amounting to fourteen and nine one-hundredth dollars ($14.09).

Frank L. Rogers, } *Auditors of*
W. Cecil Durand, } *Public Accounts.*

PAPER BOX FACTORY.

IN ACCOUNT WITH CONNECTICUT INDUSTRIAL SCHOOL FOR GIRLS.

Debtor.

To stock on hand July 1, 1889,	$1,012 57	
To bills and salaries paid from July 1, 1889, to July 1, 1890,	6,656 70	
Net earnings for the year,	4,702 08	
		$12,371 35

Credit.

By receipts from sale of boxes from July 1, 1889, to July 1, 1890,	$9,364 87	
Finished work July 1, 1890,	999 79	
Stock on hand July 1, 1890,	2,006 69	
		$12,371 35

As a school, we have reason for gratitude to an overruling Providence that has added to our School's history another two years of prosperity. We have had very little sickness to hinder our work.

During the year ending June 30, 1889, five deaths occurred among our girls. Of these, one was a girl who had been placed out, but failing in health, returned to the School to die.

But one death has occurred during the year ending June 30, 1890.

On the 14th day of April, 1889, the School, with all its friends, sustained a great loss in the death of the President of its Board of Directors, Charles Fabrique. No words of mine can add anything to your knowledge of the very great and efficient services he has rendered the School. It is a matter of history that its very existence is due, in large measure, to his persistent efforts. Inseparable from the history of the School since its first conception will ever remain the story of the earnest, persistent, and successful efforts he has made in its behalf. In his life we have an exceptional example of constant, untiring, self-sacrificing labor, in the interests of the unfortunate youth of our State. As such an one, the School loses a sincere and powerful defender and friend. As such an one, we lose from our councils one whose place cannot easily be filled. May his mantle falling on us, move us to zealous activity in the cause for which he lived, and in the service of which he died.

SCHOOLS.

Marked improvement has been made in our day schools; the teachers having been for the most part efficient and faithful, and the scholars generally disposed to improve the advantages given them.

SABBATH AND SABBATH SCHOOLS.

Public services are held in the afternoon in our chapel.

These services have been conducted by the pastors of the different churches in Middletown and Middlefield, by Professors and students of Wesleyan University and Berkeley Divinity School, also by members of the Woman's Christian Temperance Union, Young Men's Christian Association, and the Reform Club.

We hold our Sabbath School in the morning for one hour. Immediately after, the Sisters of Mercy hold their school for the same time.

The interest manifested, and the active part taken by the girls in the exercises of the Sabbath School, are certainly worthy of special mention, and give promise of a rich fruitage, in the formation of right principles and Christian character.

COOKING SCHOOL.

No one educational feature of our school meets with more unqualified approval and general commendation than our recently established cooking department, known as the Fessenden Cooking School. Here, with a qualified teacher, and all needed appliances, our girls (before going from the School) take a practical course in this most important branch of household education.

The room in which the school is held, is large, exceedingly pleasant, and centrally located. In it are represented six kitchens; five provided with cooking stoves, and one with a Reid's Combination Oven. Each kitchen is supplied with all necessary kitchen utensils.

The girls receive instruction supplementary to that already had in our different homes, and such as will enable an intelligent girl to fill acceptably the position of cook in the family in which she may be placed, when leaving the School.

SEWING SCHOOL.

In each Home the girls receive instruction in sewing, and are taught to mend, if not to make, their own clothes.

Many, however, come to the School, who have never received instruction in needle-work. It is necessary that such should receive special attention and help.

We have, therefore, instituted a sewing school, in which methodical instruction is given to the above mentioned class during the first part of each day's session. After this the members of an advanced class are taught to cut and make the different garments needed.

FANCY WORK.

This is not taught in the Sewing School, but it is encouraged to be pursued by the girls during a part of their time for recreation. In this way very commendable progress is made, and very many happy hours experienced.

IMPROVEMENTS.

We have fitted the Old Office building for a Home in which to place the younger girls of our School.

It is known as the Cottage Home. As before mentioned, a cooking department has been added to our School, and a Sewing School established.

We have built an addition to our barn, making it ninety feet long, its former length being about fifty-three feet. It has been remodeled and put in thorough repair, save the horse-stables, which will receive attention in the near future. When finished it will be quite perfect in its appointments.

We have turned our old piggery into a good hennery.

Several hundred feet of sewage pipe have been laid.

The wooden building formerly used as a storage building for our paper boxes, we have moved to another part of our grounds, where it will be used for a paint shop, and the cellar of which will be used as a storage cellar for roots and vegetables used in the School.

We have also made quite complete repairs in our sewage system.

Our pond, from which we cut our ice, has been enlarged to nearly three times its former capacity.

We have placed some five hundred dollars worth of new radiators in the Street, Pratt, and Allyn Homes, and in the Fessenden School building.

We have laid concrete walks through our grounds, connecting the Homes with the office, chapel, schools, etc. This is one of the most important improvements made, looking to the comfort and health of our girls.

Our roads are in good condition, and our grounds in pleasing dress. The improvements made at the barn, and the sewage repairs will result, we believe, in greatly improving, and largely increasing the amount of our fertilizing material.

It is a pleasure to me, to speak of the faithful coöperation and efficient services rendered by those connected with me in charge of the School.

Gentlemen:—I wish to express to you my sincere appreciation of the most cordial support, and valued suggestions, and advice, I have received at your hands, not only during the past year, but ever since my connection with the School.

With zeal unabated, and a constant reliance upon an overruling Providence to direct in all our acts and deliberations, let us enter with an earnest spirit upon the work of the new year.

Respectfully submitted,

W. G. FAIRBANK, *Superintendent.*

MIDDLETOWN, CONN., June 30, 1890.

DONATIONS.

September, 1889.—Lot "Gospel in all lands."

October.—W. H. Bishop, lot of papers.

December.—A. G. McKee, city, 6 ladies' packets, 2 china doves, 1 hair brush, 6 cologne jugs, 14 bottles cologne.

Mrs. Candee, New Haven, 5 handkerchiefs, 5 Christmas cards, 5 bottles cologne, 5 Chinese Christmas cards.

H. Bernhard, city, 27 scrap books, 6 collars, 22 handkerchiefs, 2 boxes, 5 easel picture frames, 5 needle cases, 1 scholar's companion, 3 boxes perfumery, 2 match safes, 4 inkstands, 21 yards ribbon.

Murray Closson, city, lot Youth's Palladium.

Mrs. W. H. Smith, New Britain, 25 baskets.

Charles M. Fabrique, 1 large crayon picture of Hon. Charles Fabrique.

James H. Bunce, city, 6 muffs, 27 bottles of cologne, 6 jewel boxes, 15 jewel saucers, 20 silk handkerchiefs, 13 plush pocket-books, 12 pocket books, 17 baskets, 4 string baskets, 1 brass easel.

L. R. Hazen, city, 266 Christmas cards, 39 books.

Miss S. C. Clark, city, 24 sliced pictorial Metagrams, 6 picture blocks' 7 boxes building blocks, 22 slates.

Mrs. Nelson Hall, New Haven, an organ for Russell Home.

March, 1890.—Mrs. Nellie Douglas, city, large lot of papers.

April.—S. G. Beardsley, Bridgeport, bound volume of Youth's Companion.

May.—E. K. Hubbard, city, 78 volumes for library.

Mrs. R. G. Pelton, Portland, lot of papers.

June.—E. K. Hubbard, city, 146 volumes for library.

Daniel T. Haines, city, large lot of papers.

The following papers have been regularly sent to the School, free of charge: Daily Courant, Hartford; Evening Post, Hartford; Weekly Times, Hartford; The Constitution, Middletown, five copies; Sentinel and Witness, Middletown; Daily Penny Press, Middletown; Daily Herald, Middletown; Daily Journal, Middletown; Christian Secretary, Hartford; Temperance Banner; Good Health, Battle Creek, Mich.; The Howard Times, R. I.; The Summary, Elmira, N. Y.; Traveler's Record, Hartford; The Delaware County Advocate, Pa.; The Advance, Jamesburg, N. J,; Lyman School Enterprise, Westboro', Mass.

Farm Report.

Farm Products Furnished to School from July 1st, 1889, to July 1st, 1890.

Apples,	40	barrels,	$60 00
Beets,	56	bushels,	42 00
Beans (shell),	15	"	15 00
Beans (string),	25	"	18 75
Butter,	1,220	pounds,	305 00
Cherries,	15	quarts,	1 50
Corn (sweet),	20	bushels,	20 00
Cucumbers,	25	"	50 00
Cabbage,	2,500	heads,	150 00
Eggs,	283	dozen,	50 94
Lettuce,	3,000	heads,	90 00
Milk,	30,469	quarts,	1,218 76
Onions,	30	bushels,	22 50
Potatoes	252	"	163 80
Peas,	15	"	15 00
Pie Plant,	1,500	pounds,	45 00
Raspberries,	200	quarts,	20 00
Squashes (summer),	800	-	24 00
Squashes (winter),	3	tons,	75 00
Turnips,	61	bushels	18 30
Tomatoes,	50	"	30 00
Field Beets,	14	tons	56 00
Hay,	57	tons,	1,026 00
Oats,	4½	tons,	81 00

Meat Consumed.

Beef,	2,414	pounds,	$168 98
Veal,	432	"	51 84
Pork,	1,600	"	112 00

The Live Stock consists of:

4 Horses,	$400 00
14 Cows,	560 00
1 Heifer,	15 00
14 Hogs,	140 00
4 Shoats,	20 00
200 Hens,	100 00
50 Chickens,	12 50

Treasurer's Report.

From June 30th, 1889, to July 1st, 1890.

RECEIPTS.

Balance, July 1st, 1889,	$234 65
From State for board of girls,	35,604 39
From box business (sales),	10,015 71
From coal sold,	110 05
From private board,	39 00
From farm and telephone,	71 21
From donations (rent of house),	192 00
From rags sold,	9 04
From laundry,	122 33
From barrels sold,	12 96
From services of girl,	18 00
From saw sold,	12 00
From dry goods sold,	15
Total receipts,	$46,441 49

EXPENDITURES.

Paid 438 orders of Executive Committee,	$45,970 16
Balance in Treasury July 1st, 1890,	471 33

Respectfully submitted,

C. F. Browning, *Treasurer.*

Middletown, Conn., August 28th, 1890.

This will certify that we have examined the accounts of Charles F. Browning, Treasurer of the Connecticut Industrial School for Girls, for the fiscal year ending June 30th, 1890, compared the vouchers therewith, and found the same correct, showing a balance in the hands of the Treasurer amounting to four hundred and seventy-one and thirty-three one-hundredth dollars ($471.33).

Frank L. Rogers, } *Auditors of*
W. Cecil Durand, } *Public Accounts.*

PHYSICIAN'S REPORT.

To the Honorable Directors of the
Connecticut Industrial School for Girls:

GENTLEMEN: The fiscal year embracing the period from July 1st, 1888, and July 1st, 1889, has been one of very remarkable health to those under your corporate care. The most important disease was dysentery, a sharp epidemic of which appeared during the latter part of August, 1888, ushered in by a very malignant case, which proved fatal after about twenty-four hours' sickness. Other cases of varying intensity, but mostly of a mild type, followed at the Allyn Home, to which the cases were mostly confined. It was difficult to know just how many mild cases there were. Though the epidemic was local, a careful investigation of the sanitary condition of the Allyn Home failed to discover anything to cause it, and the subsequent good health of those residing there seems to prove that the cause was atmospheric. A large proportion of the inmates of the Allyn Home were affected by it. There were four cases of phthisis in its various stages during this period. One death was caused by it—a girl who had gone to her home to remain, as was supposed, was returned by her friends and lived only a few days. A case of chronic dysentery required frequent and long continued attendance during October and November. The fiscal year 1889-90 has been one of continued good health. August 5, 1889, a patient died of typhoid dysentery after an illness of less than two days. Other cases of a milder type followed, and cases were also in the city, showing atmospheric causation. Otherwise there has been nothing notable in the character of the diseases treated.

The concrete walks through the grounds have probably diminished considerably the many acute diseases formerly represented by sore throat, bronchitis, pneumonia and colds in various forms. The variety of diseases has been smaller than usual. There have been cases of severe eye inflammation in three pupils, cases of anæmia, gastric inflammation, scrofula, melancholia, hæmatemesis, severe epistaxis, colic, epilepsy, tonsilitis, rheumatism and erysipelas.

Besides those enumerated, my attention has been called to many minor ailments, including an occasional case of malaria. It affords me great pleasure to mention the kind co-operation of your superintendent, his able assistant, the matrons and assistant matrons of the several Homes.

Very respectfully,

F. D. Edgerton, M. D.

88 Washington St.
July 1st, 1890.

Visiting Agent's Report.

To the Directors of the Connecticut
Industrial School for Girls:

Gentlemen:—In making a report of our placing-out system, of which the Visiting Agent has immediate charge, we have thought it might be well at this time to comprehend in such report, the results obtained during a period of nearly four years, dating from the time when we took charge of the School, September 7, 1886.

Since this time we have provided homes for 261 different girls. Thirty three of these have been returned and are with us at present, leaving 228 still in outside homes. Quite a number of these have become 21 years of age.

In looking over the history of each, as it appears at the present, we find that 14 have been unfortunate, 5 after they became 21 years of age, 9 while under the care of the School. One of these was under consideration to be provided for when we came to the School. She returned to us for a short time. I have, therefore, counted her as one.

Ten girls have left their places without permission. Two of these are not all they should be; the whereabouts of eight is not positively known. Two others are not as pure in character as we could desire.

From this we find that 14 have become unfortunate. Four have become lewd characters. Of eight we have no positive knowledge, therefore, we are not warranted in concluding them evil in character. I have, nevertheless, counted them out, and find that 88 per cent. are doing well.

It is worthy of our consideration that of the 14 who were unfortunate, all save two give evidence of a determination to have their future what it should be.

This you will perceive to be an exact statement, which may be verified by the records of this department of our School.

As we place our girls in families, an arrangement is made by which the girl receives a stipulated amount per week as wages for her services, which amount may be increased from time to time as she becomes more proficient in her work. We also seek to procure for our girls from those with whom they are placed, that parental care and oversight so necessary to be given them at this most critical period of their lives.

The money received for their services, less their expenses, is sent quarterly to the School.

This money, so received, is placed in the Savings Bank in the name of the girl. When she becomes 21 years of age the money to her credit in the bank is given her by the Treasurer of the School.

As our girls become of age, and return to receive the money they have been able to save from their earnings, through the care and interest the School has taken in them, it is most gratifying to us to note their improved condition, as compared to what it was when they were committed to our charge, and the inspiration they have received to work out for themselves a true and noble life.

A large majority of them are most pleasing examples of what the School can, and does, accomplish for those placed under its care.

Respectfully submitted,

MRS. W. G. FAIRBANK,

Visiting Agent.

MIDDLETOWN, CONN., June 30, 1890.

APPENDIX A.

BY-LAWS.

CHAPTER I.

DIRECTORS.

1. The government of the School shall be vested in a Board of fifteen Directors, of which the Governor, Lieutenant-Governor, and Secretary of State shall be Directors, *ex-officio*.

2. The term of office of the eleven Directors chosen shall be three years, except as hereinafter provided. At the close of the third year after their appointment they shall be divided by lots into three classes. The full Board of Directors shall then choose by ballot, three or four Directors to serve in the place of the first class, whose places shall then become vacant. At the close of the fourth year the Board shall choose three or four in the places of the second class. At the close of the fifth year, three or four in the places of the third class, and annually thereafter in the places of the senior class, whose places shall become vacant upon the appointment and qualification of their successors. The Board may fill all vacancies occurring during the year, and the retiring members shall be eligible for re-election. No Director shall receive compensation for his services as a Director, but shall be allowed for his expenses incurred in the discharge of such services.

3. The Directors shall exercise a general supervision over the Institution, and shall frequently and carefully inspect it in all its departments. They shall have power to make, alter, or amend all by-laws. They shall appoint and regulate the duties and salary of the Superintendent, and remove him at their discretion. They shall be the guardians of the girls during the period of their commitment (unless otherwise provided for); shall procure for them suitable employment and instruction while at the School, and shall transfer them to suitable private families, or other places of abode at the earliest proper period, and shall see that they receive equitable and kind treatment from those to whom they are committed on leaving the School; and in general, the Directors shall possess all powers needful in order to the proper discharge of their official duties. Four of their number shall constitute a quorum for the transaction of ordinary business, but seven shall be required for the purchase and sale of the real estate of the Institution, for the appointment of new Directors and of the Superintendent, and for the change of its by-laws.

4. They shall hold an annual meeting the third Wednesday of September, and quarterly meetings the third Wednesday of December, March and June. At the annual meeting they shall make a full and verified report of their trust, choose a President, Secretary, Treasurer, and an Executive Committee, and a Visiting Committee of twelve ladies, and transact such other business as the interests of the Institution shall demand.

5. At the quarterly meeting there shall be a careful review of the state and management of the Institution, and of the progress and condition of the inmates.

6. The President shall call extra meetings at the request of any two Directors, and perform all the other duties usually pertaining to his office.

7. The Secretary shall keep a full record of the meetings of the Board, prepare such papers as they shall direct, give notice in writing to each Director of the time and place of meetings, and communicate to the Treasurer the action of the Board in regard to its funds.

8. The Treasurer shall have charge of the trust funds of the School, and give a full report thereof at their annual meeting, and at other meetings when required, and shall give such bonds and receive such compensation as the Executive Committee shall deem proper.

9. The Executive Committee shall, when necessary, act for the Board during the intervals between its meetings, but shall make no change in its plan or discipline without the consent of a majority of the Directors. They shall be the especial advisors of the Superintendent, and report their doings to the next meeting of the Board.

10. Two of the Visiting Committee of Ladies shall be requested to visit the Institution at least once in two months, and thoroughly inspect its domestic arrangements, and report thereof to the Secretary of the Board. Their expenses shall be defrayed from the funds of the School.

11. The Directors, or any two of them, may give to the Registrar or Town Clerk their written consent to the marriage of any girl under the guardianship and control of this corporation, when, in their judgment, such consent would be proper, pursuant to the statute law concerning marriage license.

CHAPTER II.

OFFICERS.

1. The officers of the Institution shall consist of a Superintendent and Assistant Superintendent, appointed by the Directors; a Matron and Assistant Matron for each Home; a Principal Teacher, a Farmer, and such other instructors and assistants as may be found necessary.

The officers shall be appointed and dismissed, and their salaries regulated by the Superintendent, subject to the approval of the Board of Directors at their next subsequent meeting.

2. They shall reside at the Institution. None of the subordinates shall leave it without the permission of the Superintendent. All shall aid in maintaining the rules and discipline, and give such assistance as shall be necessary in order thereto, and be especially careful to sustain each other in the presence of the girls.

CHAPTER III.

SUPERINTENDENT.

1. The Superintendent shall have the general charge of the Institution; shall be the executive of the Directors, and see that all their instructions and the rules of the School are carried out.

2. He shall frequently inspect the Institution in all its departments, and see that the subordinate officers are punctual and faithful in the discharge of their respective duties.

3. He shall keep a journal, and make record of all occurrences worthy of notice, which record shall be subject to the inspection of any member of the Board.

4. He shall perform the correspondence, keeping files of all letters received and copies of those sent, so far as of importance, for reference. In suitable books he shall keep regular and complete accounts of all receipts and expenditures, and of all property entrusted to his care, showing the expense and income of the Institution.

5. He shall make out and present to the Comptroller the bills for weekly board and other necessary expenses of the girls, according to law.

6. Under the advice and direction of the Executive Committee, he shall procure the necessary supplies for the Institution, and purchase all such articles and materials as may be wanted for the support and employment of the girls, and dispose of all articles raised on the farm, or manufactured by them, which are not wanted for use.

7. At the annual meeting he shall make a report to the Board of everything pertaining to the inmates and general state of the School up to the 1st of December, and at each quarterly meeting give such information as the Directors require, and at all times be ready to perform whatever other duties may be required for the good of the Institution.

8. In connection with the Executive Committee, he shall decide upon all applications for the services of the girls. No inmate shall be permitted to perform service in a public house, or in a family where spirituous liquors are used as a beverage, or be indentured to an unmarried man.

9. He shall keep a register of the name and age of each inmate of the Institution, with the date of her admission; a sketch of her life, including her birthplace; a description of her person; the name, residence, nativity and character of her parents; by whom committed; for what cause; when and how discharged; also a record of her conduct while in the Institution, and, as far as possible, after she shall have left it.

10. Whenever a girl is placed out at service, he shall keep a record of the person, residence and employment of the employer, and of the service and terms for which she is employed. In case of his receiving notice of the ill-treatment of any girl, it shall be his duty at once to examine into the case and to take such measures in reference to it as the circumstances require.

11. The Assistant Superintendent may, by direction of the Superintendent, perform any of his duties, and in his absence, shall have control and supervision of the School.

CHAPTER IV.

MATRONS.

1. A Matron shall be placed over each house, who shall have its general superintendence and discipline, and be held responsible for all its officers and inmates and management, under the supervision and with the advice and aid of the Superintendent.

2. She shall keep a full record of the entrance and leaving, of the conduct and improvement of the girls in her family, of all work done, and of everything necessary to show the state of the Home; which record shall always be open to the inspection of the Superintendent. She shall make an annual report to the Directors.

3. She shall see that cleanliness, order and propriety are maintained in all the apartments of her house, and in the person, dress and rooms of the inmates, and that suitable care is given to the sick.

4. She shall endeavor especially to impress upon her charge the duty and advantage of a moral and religious, and the evils and miseries of a wicked life; and inculcate all the practical virtues that adorn the life and beautify the character.

5. She shall see that her assistants are diligent and faithful in the discharge of their appropriate duties, discreet and regular in their deportment, and strict in their observance of the regulations of the Institution, and report any remissness to the Superintendent.

CHAPTER V.

ASSISTANT MATRONS.

1. In each family there shall be an Assistant Matron, who shall have charge of the kitchen, laundry or other domestic concerns.

2. She shall be responsible to the Matron for the cleanliness and order of her department, for the conduct, industry and instruction of the girls employed with her, and, in the absence of the Matron, shall take charge of the Home.

CHAPTER VI.

TEACHERS.

1. The Principal Teacher shall have charge of the discipline and instruction of the School, and of the order and cleanliness of the School room; she shall have the care of the Library, and be responsible for all books and furniture belonging to the School and Chapel. She shall render in the Home in which she resides such assistance as is necessary for its order and discipline. She shall make an annual report.

2. The Assistant Teachers shall, during school hours, instruct the classes assigned to them, and at other times, under the Matron, perform such duties as may be appointed to them in the Homes.

CHAPTER VII.

FARMER.

1. The Farmer shall attend to the stock and take proper care of the barns, and in winter of the furnaces; shall do the teaming and work of the farm so far as he is able, and render the Superintendent any assistance he may require, not inconsistent with other duties.

CHAPTER VIII.

GENERAL REGULATIONS.

1. The hours of labor, study, rest, and recreation shall be arranged from time to time by the Superintendent and Matrons.

2. All persons employed in the Institution, in whatever capacity, are required to devote their whole attention to the performance of their duties. Each officer shall see that the rules and regulations are fully observed.

3. No inmate will be permitted to leave the premises, except by permission of the Superintendent.

4. The Institution will be open for visitors each Wednesday, from half-past two till five o'clock P. M.; but visitors cannot be admitted to any part of the premises, at this or other times, without the express permission of the Superintendent or of his assistant.

5. Punishment may be inflicted by the deprivation of amusement, and recreation, by withholding some favorite article of food, or some privilege or indulgence, by loss of rank and standing in the class, by imposing some irksome duty, by close or solitary confinement for a limited period, and, when it becomes absolutely necessary to maintain good order and enforce the rules and regulations of the Institution, by corporal infliction by the Superintendent, or under his direction, a record of the time, manner, and circumstances of which punishment shall be made.

6. These By-Laws may be altered, amended or repealed at any regular meeting of the Directors.

APPENDIX B.

LAWS

Relating to the Connecticut Industrial School for Girls.

AN ACT INCORPORATING THE CONNECTICUT INDUSTRIAL SCHOOL FOR GIRLS.

Resolved by this Assembly:—SEC. 1. That James E. English, William A. Buckingham, Esther Pratt, Timothy M. Allyn, Edmund G. Howe, Roland Mather, Alfred Smith, Henry A. Perkins, Francis B. Cooley, George Beach, Richard S. Ely, John B. Eldridge, John H. Goodwin, James Root, C. C. Lyman, Caroline A. Street, Mary Hillhouse, Mary L. Skinner, Jane Hubbard, Hervey Sanford, William W. Boardman, Ezra C. Reed, Richard S. Fellowes, Nathan Peck, Charles Fabrique, Cornelius S. Bushnell, Moses Y. Beach, H. D. Smith, Thomas K. Fessenden, and their associate subscribers, be, and they are hereby constituted a body politic and corporate, by the name of "THE

CONNECTICUT INDUSTRIAL SCHOOL FOR GIRLS," and by that name shall have perpetual succession, and may sue and be sued, may plead and be impleaded, in the courts of this State and elsewhere, may have, use, or change a common seal, may receive, hold, or convey any estate, real or personal, that may be committed to it, may act as a guardian to the person of any girl who, between the ages of eight and *fifteen years shall be committed to its charge, according to law, for the physical, mental, and moral training of such girl, which guardianship of such girl shall supersede any other guardianship of parents or guardians during the time that such girl is under the charge of this corporation, and no longer; and may make such by-laws and appoint such officers and agents as shall be specified in such by-laws, or as may be necessary to carry out the purposes of the corporation; but it shall be provided by such laws that the Governor, Lieutenant-Governor, and Secretary of State shall be *ex-officio* of the principal officers of the corporation.

SEC. 2. The said corporators shall meet for the first time at the call of three of the corporators to organize this corporation, adopt by-laws, and do whatever else may be necessary and proper.

SEC. 3. The funds, property, and estate which may be granted to or held by said corporation for the uses hereinbefore expressed, shall, with the income thereof, be exempted from taxation.

SEC. 4. This resolution may be amended, altered, or repealed, at the pleasure of the General Assembly.

Approved, July 27th, 1868.

GENERAL ASSEMBLY, MAY SESSION, 1873.

AN ACT AMENDING THE ACT INCORPORATING THE CONNECTICUT INDUSTRIAL SCHOOL FOR GIRLS.

Be it enacted by the Senate and House of Representatives in General Assembly convened:

SECTION 1. The age of girls committed to the Connecticut Industrial School for Girls shall be between eight and *sixteen years.

SEC. 2. In addition to the Directors now existing, two other Directors shall be annually chosen in the manner provided by law.

SEC. 3. This act shall take effect from its passage.

Approved, July 1st, 1873.

REVISED STATUTES OF 1888.

CONNECTICUT INDUSTRIAL SCHOOL FOR GIRLS.

SEC.

3638. Made a school district.
3639. School committee; acting school visitor.
3640. Public Money.
3641. Who may be sent to it.
3642. When officers may arrest and procure commitment of girls.
3643. Costs on mittimus.
3644. Directors may discharge from school.
3645. Age, etc., to be endorsed on mittimus.
3646. Industrial School to be guardian, etc.
3647. Support of girls committed to the school.
488. Courts of Probate shall have concurrent jurisdiction in commitments.
2110. Cities and Towns may make By-Laws concerning Truants.
2111. Truant Officers.
2112. Truants, Arrest of, etc.
2113. Truants may be committed to the Reform School or to the Industrial School. (See Sec. 2117).
2114. Fees of Officers arresting Truants.
2115. Warrant and Hearing.
2116. Suspending Judgment.
2117. Truants and Vagrant Girls may be Commited to the School.
3659. Certain Children not to be sentenced to the School, unless, etc.
3660. Transfer of Children from the School to the County Home.
3661. Guardianship not affected.
1497. Aiding Escape from School.
3676. Religious Instruction.

SEC.

3677. Binding out to Service.
3678. Parent or guardian may indenture child to the School.
3679. Privileges of Indentured Child.
3680. Sentence of girl may be in the alternative.
1381. Court may make order as to children during pendency of proceedings for commitment. Expense to be taxed as part of the costs. Restriction in cases of contagious diseases or where charged with crime.
1740. Apprentices may be indentured by Selectmen.
1743. Apprentices may be released from service if neglected by Master.
1885. Inspection of Institution by State Board of Charities.
1886. School to be visited once a month by members of State Board of Charities.
1567. Unlawful taking of fees and commissions by public officers, trustees, etc.
1568. Furnishing supplies by officer or trustee when prohibited.
3719. Justices of the Peace.—Fees.
3709. Judge of Police or City Court.—Fees.
3729. Sheriffs and other officers' fees.
105. Death; Notice of, to be given by Superintendent.
379. Estimates of State expenses to be made biennially.
380. By whom to be made.
331. Number of annual reports to be printed.

PUBLIC ACTS OF 1889.

CHAPTER CLXXI.

SEC.

1. An act concerning appeals from judgments committing children to the State Reform School, the Connecticut Industrial School for Girls, or to Homes for Dependent and Neglected Children.

SEC.

2. Who may take appeal.
3. Judgment, when not vacated by appeal.
4. Criminal complaint against child to be tried by jury on appeal.

Made a School District.

Section 3638. The Connecticut Industrial School for Girls shall, so long as it remains an incorporated institution of this State and maintains a school for the benefit of children connected therewith, be a separate school district, with a territorial limit including the grounds and buildings occupied by the inmates of said institution as homes. All other territory belonging to said institution shall be a part of the district to which the same territory belonged before the Industrial School for Girls was established.—*1886; Chap. 96, Sec. 1.*

School Committee.—Acting School Visitor.

Sec. 3639. The State Board of Education shall be the school committee of said district, and shall possess all the powers and be subject to all the duties within said district that are possessed by the school visitors in the several towns; and may appoint an acting school visitor in said district, who shall possess, within said district, all the powers, and be subject to all the duties of similar officers appointed by school visitors. The authority of the board of school visitors of the town in which said district is situated shall extend only to the remaining portion of said town; and their returns and certificates shall include only the children of such remaining portion.—*1886; Chap. 96, Sec. 2.*

Public Money.

Sec. 3640. The treasurer of the State Board of Education shall draw an order each year in favor of said district on the treasurer of said town, for the proportionate amount to which said district may be entitled, of all moneys appropriated by law for the benefit, support, and encouragement of public schools, as is provided in respect to towns.—*1886; Chap. 96, Sec. 3.*

Who may be sent to it.

Sec. 3641. The parent or guardian of any girl between the ages of eight and sixteen years, or a selectman or grand juror, or other informing officer, of the town where she may be found, may present a written complaint to the judge of the Court of Probate for the district in which such town is, or to the judge of the Police Court of any city, sitting in chambers, where she may be found, or to any justice of the peace of such town, alleging that she has committed any offense within the final jurisdiction of a justice of the peace, or belongs to the class specified in sections 2109, 2110, and 1740, or that she is leading an idle, vagrant or vicious life, or is in manifest danger of falling into habits of vice, praying that she may be sent to the Connecticut Industrial School for Girls, and such judge or justice of the peace shall thereupon, after notice to her and such other notice as he may deem proper, inquire into said complaint, and on being satisfied of the truth of the allegations therein, may order her to be committed to the guardianship and control of such School, until she shall arrive at the age of twenty-one years, unless sooner lawfully discharged; and if he finds that she has committed an offense punishable by imprisonment, other than imprisonment for life, she may be sentenced to the Connecticut Industrial School for Girls, or judgment may be suspended, on such terms, and for such time, as he may prescribe; and said authority may issue a warrant for the execution of such sentence; but this chapter

shall not be construed to deprive any girl of fourteen years of age and upward from the privilege of choosing her own guardian, with the approval of the Court of Probate, as provided by law.—*G. S. 1875, Chap. 94, Sec. 1; 1875, Chap. 97; 1878, Chap. 122.*

When officers may arrest and proceed against girls.

Sec. 3642. Any proper officer may arrest within his precincts any girl whom he shall judge to be between the ages of eight and sixteen years, whom he shall find in any improper place or situation, and who is, in his judgment, liable to be arrested for any of the offenses specified in the preceding section, and make complaint and proceed in the same manner as a parent could do under the provisions of the preceding section.—*G. S. 1875, Chap. 94, Sec. 2; 1876, Chap. 52.*

Costs on Commitment.

Sec. 3643. The authority committing any girl to said School shall transmit a certified copy of the items of the costs on the complaint to the clerk of the Superior Court for the County in which the trial was had, within thirty days after the trial, and said costs shall be taxed and paid as costs are taxed and paid in criminal causes coming to the Superior Court from an inferior court.—*1883, Chap. 11.*

Discharge by Directors.

Sec. 3644. The Directors, or any two of them, may discharge from said School and return to her parent or guardian, or to the Selectmen of the town, any girl who, in their judgment, ought not to be retained.—*G. S. 1875, Chap. 94, Sec. 4.*

Age, &c., to be Endorsed on Mittimus.

Sec. 3645. The authority committing any girl to said School shall ascertain as nearly as possible, and endorse on the mittimus, her age, parentage, birthplace, offense, and such other facts relative to her as may aid in her proper care and instruction in the School; and the age thus ascertained shall be taken as the true age of said girl with reference to the term of her commitment.—*G. S. 1875, Chap. 94, Sec. 5.*

Industrial School to be Guardian.

Sec. 3646. In addition to the guardianship of the person, the Connecticut Industrial School for Girls shall be the guardian of any estate that may be acquired by the personal services of any girl while under its guardianship and control.—*1885, Chap. 5.*

Support of Girls Committed to the School.

Sec. 3647. There shall be taxed monthly in each year, by the Comptroller, not to exceed two dollars and seventy-five cents a week, for the necessary expenses of each girl committed to School, and the Superintendent shall make his bill therefor and present it to the Comptroller, who upon finding the same to be just, shall allow it, and it shall be paid from the State treasury.—*G. S. 1875, Chap. 95, Sec. 6; 1885, Chap. 75; 1887, Chap. 72.*

Selectmen may Bind out Children Negligently Cared for at Home.

Sec. 2109. The selectmen, in every town, shall inspect the conduct of the heads of families, and if they find any who neglect the education of the children under their care, may admonish them to attend to their duty; and if they continue negligent, whereby the children grow rude, stubborn and unruly, they shall, with the advice of a justice of the peace, take such children from those who have the charge of them, and bind them out to some proper master, or to some charitable institution or society incorporated in this State for the care and instruction of such children, males till twenty-one, and females till eighteen years of age, that they may be properly educated and brought up in some lawful calling.—*G. S. 1875, 127, Sec. 7.*

Cities and Towns may make By-Laws Concerning Truants.

Sec. 2110. Each city and town may make regulations concerning habitual truants from school, and children between the ages of seven and sixteen years, wandering about its streets or public places, having no lawful occupation, nor attending school, and growing up in ignorance; and such by-laws, also, respecting such children, as shall conduce to their welfare and to public order, imposing suitable penalties, not exceeding twenty dollars for any one breach thereof; but no such town by-laws shall be valid, until approved by the Superior Court in any county.—*G. S. 1875, 127, Sec. 8.*

Truant Officers.

Sec. 2111. Every town, and the mayor and aldermen of every city, having such by-laws, shall annually appoint three or more persons, who alone shall be authorized to prosecute for violations thereof. All warrants issued upon such prosecutions shall be returnable before any justice of the peace, or judge of the city or police court of the town or city.—*G. S. 1875, 127, Sec. 9.*

Truants, Arrest of, etc.

Sec. 2112. The police in any city, and bailiffs, constables, sheriffs and deputy sheriffs in their respective precincts, shall arrest all boys between eight and sixteen years of age, who habitually wander or loiter about the streets or public places, or anywhere beyond the proper control of their parents or guardians, during the usual school hours of the school term; and may stop any boy under sixteen years of age, during such hours, and ascertain whether he is a truant from school; and if he be, shall send him to such school.—*1877, Chap. 98.*

Truants may be Committed to Reform School, (or to the Industrial School. See Sec. 2117)

Sec. 2113. Any boy arrested a third time under the provisions of the preceding section, if not immediately returned to school, shall be taken before the judge of the criminal or police court, or any justice of the peace in the city, borough, or town where such arrest is made; and if it shall appear that such boy has no lawful occupation, or is not attending school, or is growing up in habits of idleness or immorality, or is an habitual truant, he may be committed to any institution of instruction or correction, or house of reformation in said city, borough, or town, for not more than three years, or, with the approval of the selectmen, to the State Reform School.—*1877, Chap. 98.*

Fees of Officers Arresting Truants.

Sec. 2114. Officers other than policemen of cities shall receive for making the arrests required by the two preceding sections, such fees, not exceeding the the fees allowed by law for making other arrests, as may be allowed by the selectmen of the town in which such arrests are made, but unless a warrant was issued by a judge of the criminal or police court, or by a justice of the peace, the officer shall, before receiving his fees, present to the selectmen of the town a written statement showing the name of each boy arrested, the day on which the arrest was made, and if the boy was returned to school, the name or number of the school to which he was so returned.—*1877, Chap. 98.*

Warrant and Hearing.

Sec. 2115. In all cases arising under the provisions of the three preceding sections, a proper warrant shall be issued by the judge of the criminal court of the city, or by a justice of the peace in the borough or town, where such arrest is made; and the father, if living, or if not, the mother or guardian of such boy, shall be notified, if such parent or guardian can be found, of the day and time of hearing. The fees of the judge or justice shall be two dollars for such hearing; and all expenses shall be paid by the city, borough, or town in and for which he exercises such jurisdiction.—*G. S. 1875, 128, Sec. 12.*

Suspending Judgment.

Sec. 2116. After the hearing in any such case, such judge or justice of the peace may, at his discretion, indefinitely suspend the rendition of judgment.—*G. S. 1875, 128, Sec. 13.*

Truant and Vagrant Girls may be Committed to the School.

Sec. 2117, Upon the request of the parent or guardian of any girl between eight and sixteen years of age, a warrant may be issued for her arrest in the same manner and on the same conditions as is provided in the preceding sections with respect to boys; and thereupon the same proceedings may be had as are above provided, except that said girls may be committed to the Connecticut Industrial School for Girls.—*G. S. 1875, 128, Sec. 14; 1876, Chap. 52.*

Certain Children not to be Sentenced to the School, Unless, etc.

Sec. 3659. No child belonging to either of the classes specified in section 3655 shall be sentenced or committed by any court or justice of the peace to the State Reform School, or the Connecticut Industrial School for Girls, unless such child is found to have committed an offense punishable by law, or is leading an idle, vagrant, or vicious life, or the court or magistrate is of opinion that the child's previous circumstances and life have been such as to make it desirable that such child should be placed under the restraint, care and guardianship of one of said schools.—*1886, Chap. 92.*

Transfer of Children from the School to the County Home.

Sec. 3660. The Directors of either of said schools may at their discretion transfer any child belonging to either of the classes specified in section 3655, sentenced or committed to such school, to the county home of the county from which such child was sentenced or committed, after reasonable notice to the

board of managers thereof. The superintendent of such school shall immediately notify the comptroller of such transfer, and the expense of supporting the child in such home shall be paid by the State, as provided in case of children committed to temporary homes by process of law.—*1886, Chap. 92.*

Guardianship not Affected.

Sec. 3661. Such transfer shall not divest the school from which the child is transferred of its guardianship and control over such child unless the same be relinquished by the board of directors of such school.—*1886, Chap. 92.*

Death; Notice of to be Given by Superintendent.

Sec. 105. Whenever any boy committed to the State Reform School, or any girl committed to the Industrial School for Girls, shall die, the Superintendent shall cause immediate notice thereof to be sent by mail to the registrar of births, marriages and deaths of the town from which said boy or girl was so committed. —*1884, Chap. 94, p. 372.*

Aiding Escape from School.

Sec. 1497. Every person who shall aid or abet any girl in escaping from the Connecticut Industrial School for Girls, or any boy from the State Reform School for Boys, or who shall knowingly harbor such boy or girl, or aid in abducting them from persons to whose care and service they have been properly committed, shall be fined not less than fifty nor more than one hundred dollars, or imprisoned not more than sixty days.—*1876, Chap. 52.*

CHAPTER CCXXX.

GENERAL PROVISIONS.

Religious Instruction.

Sec. 3676. Equal privileges shall be granted to clergymen of all religious denominations to impart religious instruction to the inmates of the Schools mentioned in Chapters ccxxv. and ccxxvi.; and every opportunity shall be allowed such clergymen to give such inmates, belonging to their respective denominations, such religious and moral instruction as they may desire; and the trustees of each of said institutions shall prescribe reasonable times and places, not inconsistent with its proper management, when and where such instruction may be given, which shall be open to all who may choose to attend.—*G. S. 1875; Chap. 98, Sec. 1.*

Binding out to Service.

Sec. 3677. The Trustees of the State Reform School may bind out as apprentices, and the Directors of the Connecticut Industrial School for Girls may bind out to service, persons committed to such schools, respectively, for a term not exceeding the term of their commitment.—*G. S. 1875; Chap. 98, Sec. 2.*

Parent or Guardian may Indenture Child to the School.

Sec. 3678. Any parent or guardian may indenture a child or ward to the State Reform School, or to the Connecticut Industrial School for Girls, on such uniform terms as may be agreed upon between such parent or guardian and the

trustees or directors of said schools, the expense to be paid quarterly in advance; and in case of any failure on the part of such parent or guardian so to pay said expense, the Superintendent of said State Reform School, or Connecticut Industrial School for Girls, as the case may be, may sue on such agreement.—*G. S. 1875; Chap. 98, Sec. 3.*

Privileges of Indentured Child.

Sec. 3679. Every child indentured or admitted to the State Reform School, or the Connecticut Industrial School for Girls, shall be entitled to the same supervision, medical treatment, support and education, and subject to the same regulations, employment, and restraint as all its other inmates.—*G. S. 1875; Chap. 98, Sec. 4.*

Sentence of Girl may be in the Alternative.

Sec. 3680. The sentence of any girl to the Connecticut Industrial School for Girls, may be in the alternative, as in the case of sentence to the State Reform School.—*G. S. 1875; Chap. 98, Sec. 5.*

Court may make order as to children during pendency of proceedings for commitment.—Expense to be Taxed as Part of the Costs.—Restriction in Cases of Contagious Diseases or where Charged with Crime.

Sec. 3681. When in any proceedings for the commitment of any child under sixteen years of age to the Connecticut Industrial School for Girls, or to the State Reform School, or to any temporary home for dependent and neglected children, a continuance of such cause is allowed, the court or justice of the peace before whom such proceedings are pending may make such order for the care and custody of such child during such continuance, and until the final disposition of the cause, as said authority shall judge to be for the welfare of said child; and the fees and expenses incurred in such commitment, care, and custody shall be taxed and paid as part of the costs in said proceedings, in the same manner as in cases of commitment to said institutions. But during the adjournment of the case of any child suffering from any contagious disease, or charged with any crime or vice, such child shall not be committed to the custody of a county temporary home or of any orphan asylum.—*1887, Chap. 71.*

Inspection of Institution by State Board of Charities.

Sec. 1885. The board may inspect all almshouses, homes for neglected or dependent children, asylums, hospitals, and all provisions or institutions for the care or support of the dependent or criminal classes; and they shall inspect all institutions in which persons are detained by compulsion, to ascertain whether their inmates are properly treated, and, except in cases of detention upon legal process, to ascertain whether any have been unjustly placed, or are improperly held, therein, and may examine witnesses, and send for persons and papers and correct any abuses found to exist, in such manner as not to conflict with any personal, corporate, or statutory rights, acting, so far as practicable, through the persons in charge of such institutions, and with a view to sustain and strengthen their rightful authority; and no measures shall be adopted without the assent of the persons so in charge, except at a meeting of the board, at

which at least four members shall be present, or by a written order, signed by a majority of the board. An appeal may be taken to the Governor from any action of the board, by the persons in charge of such institutions.—*1884; Chap. 77, p. 360, Sec. 2.*

School to be Visited Once a Month by Members of State Board of Charities.

Sec. 1886. The State Prison, the State Reformatory and Industrial Schools and State Insane Asylum shall be visited as often as once a month, and by at least one member of each sex; no previous notice of such visits shall be given to the persons in charge of the institution visited, and at every such visit an opportunity shall be offered to each inmate for private conversation with some member of the board. Any communication directed to said board, or to any member thereof, by any inmate of said institutions, shall be immediately forwarded, postpaid, to the post-office by the persons in charge, without inspection; and any inmate of said institutions may personally deliver to any member of said board, and any member of said board may receive, any communication, without interference or inspection of the person or persons in charge. The inmates of said institutions shall be informed of their rights under this section by the persons in charge, to the satisfaction of said board, or any visiting member thereof.—*1884; Chap. 77, p. 361, Sec. 3.*

Apprentices may be Indentured by Selectmen.

Sec. 1740. If any person, who has had relief from any town, shall suffer his children to misspend their time, and shall neglect to employ them in some honest calling, or if any person does not provide competently for his children, whereby they are exposed to want, or if any poor children in any town live idly or exposed to want, and there are none to take care of them, the selectmen of such town, with the assent of a justice of the peace, shall indenture such children, to be apprentices to some proper trade for said term, and may indenture them in like manner, to any society, incorporated for the purpose of educating and relieving orphans, or destitute children, whose place of business is in this State, and may contract with such society to defray, wholly or in part, the expenses of such child while in the institution, to an amount not exceeding one dollar and fifty cents a week; and such society shall have the same authority, with regard to such children, as over those surrendered to them by their parents. —*G. S. 1875; 193, Sec. 3.*

Apprentice may be Released from Service if Neglected by Master.

Sec. 1743. Parents, guardians, selectmen, trustees of the State Reform School, and directors of the Connecticut Industrial School for Girls, shall inquire into the treatment of apprentices indentured by them respectively; and if, after the making of such indenture, any masters and apprentices shall remove from the town where such indenture was made, to any other town in this State, or if the guardians of such apprentices are absent, refuse, or are unable to act, then the selectmen of the town where such masters and apprentices reside at the time, shall make such inquiry, and if they, the parents, guardians, selectmen, trustees, or directors aforesaid, find that the masters do not perform their part of the indenture, they shall complain to a justice of the peace in the town where such

masters and apprentices reside, who shall cause such masters and apprentices to come before him, and reconcile them if he can, and if he can not, may bind the master to appear at the next term of the court of common pleas, or district court, if there be such courts in the county in which such masters and apprentices reside, and if there are no such courts in said county, then he shall bind him to appear at the next Superior Court in said county having civil jurisdiction, and also the apprentice, or give order for his custody in the mean time and for his appearance at said court, and if it finds that the master has failed to perform his part of the indenture, it may discharge the apprentice from the service of the master, and cancel the indenture, with costs against the master, and award execution accordingly; but if the complaint shall be found untrue, and without probable cause, it shall award costs to the master against the complainant.—*1875; Chap. 73.*

Unlawful Taking of Fees and Commissions by Public Officers, Trustees, etc.

Sec. 1567. Every person being a public officer, trustee or agent, or a member of the board of management of any public or private institution, or corporation, who shall receive for his own use, directly or indirectly, from any person with whom he makes a contract, or transacts any business, as such public officer, trustee, or agent, or with whom the board of management of which he is a member, makes a contract or transacts any business, any payment, commission, or compensation, whether direct or under the form of some profitable sale, purchase, or contract, or gratuity of any kind, by reason of, or in acknowledgment for, or in connection with, the making of such contract, or the transacting such business, shall be imprisoned not less than thirty-one days nor more than one year, or fined not more than three hundred dollars, or both.—*1886; Chap. 53.*

Furnishing Supplies by Officer or Trustee When Prohibited.

Sec. 1568. Every person who, being a trustee, or officer, of any institution, receiving aid from the State, shall furnish supplies, or be interested in any contract for furnishing supplies to such institution, unless he be the lowest bidder for such supplies, or for such contract, after open competition, shall be fined fifty dollars.—*1886; Chap. 144.*

Justices of the Peace—Fees.

Sec. 3719. Justices of the Peace shall receive * * * for a hearing upon a complaint for commitment to the Connecticut Industrial School for Girls, to the State Reform School, or the temporary home for any county, two dollars; for trial of forcible entry and detainer, two dollars a day; each order of notice, mittimus, taxation of costs and certificate of the same in proceedings for commitment to said schools or homes, appointing and administering the oath to appraisers of land to be set off on execution, or of personal property attached and ordered to be sold, taking bond on the dissolution of an attachment, or a judgment and record on default, confession, or nonsuit, fifty cents; each continuance twenty-five cents; for copies of records the same as clerks of the superior court.—*1885; Chap. 63.*

Courts of Probate Shall Have Concurrent Jurisdiction in Commitments.

Sec. 488. Courts of Probate shall have concurrent jurisdiction with judges of City and Police Courts, and justices of the peace, in hearing and determining applications for commitments to the Connecticut Industrial School for Girls, and the temporary homes for dependent and neglected children, in the manner provided by law.—*1885; Chap. 110, Sec. 57.*

Judge of Police or City Court—Fees.

Sec. 3709. * * * The judge of a police or city court shall receive in proceedings to commit and commitment to the Connecticut Industrial School for Girls, the same fees as justices of the peace for like services. * * *

Sheriffs and Other Officers—Fees.

Sec. 3729. * * * For service of a mittimus to commit to the Connecticut Industrial School for Girls, necessary expenses, and a reasonable compensation.

Estimates of State Expenses to be Made Biennially.

Sec. 379. It shall be the duty of the persons mentioned in the next section, on or before the first day of December, in the year eighteen hundred and eighty-eight, and biennially thereafter, to make and transmit to the Treasurer, estimates of the amount of money required in their respective departments and offices of the State government, for the two fiscal years commencing on the first day of the following July. Such estimates shall be itemized to such an extent and in such manner as may be required by law, and by any rules, instructions, or regulations adopted by the Treasurer and Secretary.—*1884; Chap. 108. 1887; Chap. 5, Sec. 11.*

By Whom to be Made.

Sec. 380. The estimates for the different classes of expenditures shall be made as follows, to wit: * * * For the Connecticut Industrial School for Girls, by the superintendent and president of the board of directors of that institution.—*1884; Chap. 108.*

Number of Annual Reports to be Printed.

Sec. 331. The Comptroller shall annually cause to be printed, at the expense of the State, such number of copies of each of the following annual reports as is hereinafter stated: * * * of the Connecticut Industrial School for Girls, one thousand. * * *

PUBLIC ACTS OF 1889.

CHAPTER CLXXI.

An Act Concerning Appeals from Judgments Committing Children to the State Reform School, the Connecticut Industrial School for Girls, or to Homes for Dependent and Neglected Children.

Section 1. An appeal shall lie from any judgment; order, or decree of a court of probate, judge of a city or police court, or justice of the peace committing any child to the State Reform School, to the Connecticut Industrial

School for Girls, or to any county home for dependent or neglected children, to the next criminal term of the superior court to be held within and for the county where such judgment is rendered.

Who May Take Appeal.

Sec. 2. Such appeal may be taken by any parent or guardian of the child so committed, or by the selectmen of the town in which such judgment is rendered, within twenty days thereafter; and the appellant shall enter into a recognizance, with surety, to the State, conditioned to answer to the complaint and abide the order and judgment of the court thereon.

Judgment, When Not Vacated by Appeal.

Sec. 3. In case such judgment is rendered by a court of probate or judge of a city or police court, the same shall not be vacated by the appeal during its pendency, but shall remain in full force until judgment is rendered in the appellate court; but if such judgment is rendered by a justice of the peace it shall be vacated by the appeal, and such justice shall forthwith deliver to the appellant a written certificate stating that such appeal has been taken, on receipt of which the persons having possession or control of such child shall at once deliver him into the possession of the appellant.

Criminal Complaint Against Child to be Tried by Jury on Appeal.

Sec. 4. Complaints under sections 3628, 3641, and 3658 of the General Statutes shall, on appeal, be tried by a jury, and such child shall be produced in court during trial and to receive final judgment, by the appellant or by the person or persons having him in their possession or control; and the jury shall render a verdict of guilty or not guilty, or of proven or not proven, as the facts proved may warrant; and on a verdict of guilty or proven, sentence of commitment may follow as provided in said sections of the General Statutes.

Approved, June 4, 1889.

ABSTRACT

OF

Returns of County Commissioners

IN RELATION TO

JAILS, LICENSES, AND THE RECEIPTS AND EXPENSES OF THE SEVERAL COUNTIES,

IN THE STATE OF

CONNECTICUT,

FOR THE

YEAR ENDING JUNE 30, 1889.

COMPILED BY THE SECRETARY.

HARTFORD:
PRESS OF WILEY, WATERMAN & EATON.
1890.

State of Connecticut,

OFFICE OF THE SECRETARY,

HARTFORD, January 2, 1890.

The following abstracts of the returns of county commissioners in relation to jails, licenses, and the receipts and expenses of the several counties in the State, for the year ending June 30, 1889, are published in compliance with section 331, of the General Statutes.

R. JAY WALSH,

Secretary.

Abstract of Returns Concerning Jails.

Returns concerning JAILS for the County of Hartford for the year ending June 30, 1889.

[Certified by Thaddeus H. Spencer, E. G. Woodhouse and Silas M. Norton, County Commissioners.]

Number in jail, June 30, 1888,	168	
Committed during the year,	1,497	1,665
Discharged during the year,		1,499
Number remaining in jail, June 30, 1889,		166

COLOR AND SEX.

White,	Males, 1,298	Females, 152	Total white, 1,450
Colored,	Males, 39	Females, 8	Total colored, 47
	1,337	160	1,497

AGE.

Over 21 years,	Males, 1,186	Females, 149	Total adults, 1,335
Under 21 years,	Males, 151	Females, 11	Total minors, 162
	1,337	160	1,497

NATIVITY, ETC.

Natives of this state,	533
" other states,	292
" other countries,	672
" this state, who cannot read or write,	32
" other states, who cannot read or write,	28
" other countries, who cannot read or write,	170
Who have been strictly temperate,	7
" " moderate drinkers,	1,370
" " habitually intemperate,	120
" " married,	*
" " in prison before,	*

COMMITTED.

For Adultery,	7	For Evading R. R. fares,	11
Assault,	120	Exposure of person,	5
Assault with intent to kill,	6	False pretense,	7
Attempt at rape,	1	Forgery,	5
Attempt to break jail,	2	Fornication,	5
Bastardy	2	Frequenting house of ill-fame,	11
Breach of the peace,	132	Horse stealing,	4
Burglary,	32	House breaking,	1
Civil process,	12	Injury to property,	12
Common drunkards,	28	Keeping house of ill-fame,	5
Common prostitutes,	4	Larceny,	163
Contempt of court,	2	Lewd conduct,	2
Cruelty to animals,	8	Making or passing counterfeit money,	1
Defrauding,	20	Malicious injury,	10
Drunkenness,	717		
Embezzlement,	13		

*Not returned.

For Manslaughter,	2	For Taking horse without leave,	3
Murder,	2	Tramps,	5
Neglect of family,	15	Trespass on R. R.,	14
Obtaining goods on false pretense,	7	Vagrancy,	57
Resisting officer,	10	Violation of liquor laws,	8
Robbery,	5	All other offenses,	12
Setting fires,	4	Total,	1,497
Stealing from the person,	10		

Average number in confinement during the year, . . $194\frac{68}{117}$

DISCHARGED.

By writ of *habeas corpus*,	1	Sent to court and not returned,	110
Bail or recognizance,	16	Sent to state reform school,	1
Payment of fine and costs,	503	Sent to state prison,	28
Expriation of sentence,	816	Executed,	1
State's attorney,	2	Died,	1
County commissioners,	17	By process not specified above,	2
Transferred to other jails for trial,	1		
		Total,	1,499

Returns concerning JAILS for the County of NEW HAVEN, for the year ending June, 30, 1889.

[Certified by Hiram Jacobs, Albert B. Dunham and Cecil A. Burleigh, County Commissioners.]

Number in jail, June 30, 1888,	220	
Committed during the year,	2,807	3,027
Discharged during the year,		2,821
Number remaining in jail, June 30, 1889,		206

COLOR AND SEX.

White,	Males,	2,338	Females, 312	Total white,	2,650
Colored,	Males,	139	Females, 18	Total colored,	157
		2,477	330		2,807

AGE.

Over 21 years,	Males,	1,914	Females, 278	Total adults,	2,192
Under 21 years,	Males,	563	Females, 52	Total minors,	615
		2,477	330		2,807

NATIVITY, ETC.

Natives of this state,	1,143
" other states,	581
" other countries,	1,083
" this state, who cannot read or write,	46
" other states, who cannot read or write,	32
" other countries, who cannot read or write,	247
Who have been strictly temperate,	*
" " moderate drinkers,	*
" " habitually intemperate,	*
" " married,	969
" " in prison before,	1,803

* No return.

COMMITTED.

For Adultery,	2	For Keeping house of ill-fame,	3
Assault,	51	Larceny,	193
Assault with intent to kill,	5	Lewd conduct,	61
Attempt at rape,	4	Making or passing counterfeit money,	1
Bastardy,	2	Murder,	2
Bigamy,	1	Neglect of family,	27
Breach of the peace,	383	Obtaining goods on false pretense,	1
Burglary,	51	Rape,	2
Civil process,	11	Resisting officer,	65
Common drunkards,	27	Robbery,	3
Common prostitute,	2	Seduction,	2
Contempt of court,	4	Setting fires,	1
Cruelty to animals,	14	Stealing from the person,	6
Defrauding,	17	Taking horse without leave,	7
Drunkenness,	1,566	Tramps,	18
Embezzlement,	10	Trespassing on R. R.	50
Forgery,	5	Vagrancy,	104
Fornication,	9	Violation of liquor law,	2
Frequenting house of ill-fame,	17	All other offenses,	55
Horse stealing,	4		
Illegal voting,	1		
Injury to property	18	Total,	2,807

Average number in confinement during the year, . $238\frac{75}{100}$

DISCHARGED.

By Writ of *habeas corpus*,	2	Sent to state prison,	37
Bail or recognizance,	68	Sent to state reform school,	2
Payment of fine and costs,	806	Escaped and not retaken,	1
Expiration of sentence,	1,542	Process not specified above,	5
State's attorney,	188	Died,	2
County commissioners,	66		
Sent to court and not returned,	94	Total,	2,821
Sent to insane asylum,	8		

Returns concerning JAILS for the County of NEW LONDON, for the year ending June 30, 1889.

[Certified by A. Hurlbut, N. H. Ayer and W. H. Saxton, County Commissioners.]

Number in jail, June 30, 1889,	74	
Committed during the year,	821	895
Discharged during the year,		815
Number remaining in jail, June 30, 1889,		80

COLOR AND SEX.

White,	Males,	756	Females,	35	Total white,	791
Colored,	Males,	22	Females,	8	Total colored,	30
		778		43		821

AGE.

Over 21 years,	Males,	700	Females,	41	Total adults,	741
Under 21 years,	Males,	78	Females,	2	Total minors,	80
		778		43		821

NATIVITY, ETC.

Natives of this state,	307
" other states,	241
" other countries,	273
" this state, who cannot read or write,	12
" other states, who cannot read or write,	10
" other countries, who cannot read or write,	50
Who have been strictly temperate,	
" " moderate drinkers,	143
" " habitually intemperate,	205
" " married,	203
" " in prison before,	403

COMMITTED.

For Assault,	10	For Larceny,	44
Assault with intent to kill,	10	Lewd conduct,	1
Bastardy,	1	Malicious injury,	2
Breach of the peace,	71	Neglect of family,	5
Burglary,	22	Obtaining goods on false pretense,	9
Civil process,	5	Resisting officer,	9
Common drunkards,	2	Robbery,	34
Contempt of court,	1	Setting fires,	1
Cruelty to animals,	1	Stealing from the person,	3
Defrauding,	1	Taking horse without leave,	2
Drunkenness,	471	Tramps,	4
Embezzlement,	3	Trespassing on R. R.,	1
Forgery,	1	Vagrancy,	83
Frequenting house of ill-fame,	7	Violation of liquor law,	10
House breaking,	4		
Injury to property,	1	Total,	821
Keeping house of ill-fame,	2		

Average number in confinement during the year, . . $99\frac{9}{10}$

DISCHARGED.

By Bail or recognizance,	23	Sent to court and not returned,	33
Payment of fine and costs,	149	Sent to state prison,	13
Expiration of sentence,	540	By process not specified above,	7
State's attorney,	13	Died,	2
County commissioners,	16		
Transferred to other jails for trial,	19	Total,	815

Returns concerning JAILS for the County of FAIRFIELD, for the year ending June 30, 1889.

[Certified by John O. Page, George M. Olmstead and Joseph W. Johnson, County Commissioners.]

Number in jail, June 30, 1888,	127	
Committed during the year,	1,746	1,873
Discharged during the year,		1,727
Number remaining in jail, June 30, 1889,		146

COLOR AND SEX.

White,	Males,	1,513	Females, 161	Total white,	1,674
Colored,	Males,	59	Females, 13	Total colored,	72
		1,572	174		1,746

AGE.

Over 21 years,	Males,	1,481	Females, 162	Total adults,	1,643
Under 21 years,	Males,	91	Females, 12	Total minors,	103
		1,572	174		1,746

NATIVITY, ETC.

Natives of this state,	527
" other states,	426
" other countries,	793
" this state, who cannot read or write,	14
" other states, who cannot read or write,	12
" other countries, who cannot read or write,	135
Who have been strictly temperate,	67
" " moderate drinkers,	377
" " habitually intemperate,	1,312
" " married,	422
" " in prison before,	1,042

COMMITTED.

For Adultery,	3	For Larceny,	122
Assault,	151	Lewd conduct,	1
Assault with intent to kill,	16	Manslaughter,	10
Bastardy,	1	Murder,	4
Breach of the peace,	238	Neglect of family,	15
Burglary,	51	Rape,	1
Civil process,	3	Resisting officer,	22
Common drunkards,	17	Robbery,	27
Common prostitutes,	37	Seduction,	2
Contempt of court,	2	Setting fires,	3
Defrauding,	11	Stealing from the person,	32
Drunkenness,	736	Taking horse without leave,	4
Embezzlement,	2	Tramps,	57
Forgery,	3	Vagrancy,	113
Fornication,	2	Violation of liquor law,	11
Horse stealing,	3	All other offenses,	22
Injury to property,	18		
Keeping house of ill-fame,	6	Total,	1,746

Average number in confinement during the year, . . $144\frac{7}{10}$

DISCHARGED.

By Writ of *habeas corpus*, .	1	Sent to court and not returned,	25
Bail or recognizance, .	19	Sent to state prison, .	59
Payment of fine and costs,	296	Executed, . . .	1
Expiration of sentence,	1,164	By process not specified above,	32
State's attorney, .	28		
County commissioners, .	74	Total, . .	1,724
Transferred to other jails for trial, . . .	28		

Returns concerning JAILS for the County of WINDHAM for the year ending June 30, 1889.

[Certified by George Morse, A. A. Stanton and John Kelly, County Commissioners.]

Number in jail, June 30 1888, . . .	13	
Committed during the year, ...	169	182
Discharged during the year, ...		162
Number remaining in jail, June 30, 1889, . .		20

COLOR AND SEX.

White,	Males,	160	Females,	4	Total white,	164
Colored,	Males,	4	Females,	1	Total colored,	5
		164		5		169

AGE.

Over 21 years,	Males,	143	Females,	5	Total adults,	148
Under 21 years,	Males,	21	Females,	0	Total minors,	21
		164		5		169

NATIVITY, ETC.

Natives of this state, ...	38
" other states, ...	48
" other countries, ...	83
" this state, who cannot read or write, . .	0
" other states, who cannot read or write, . .	0
" other countries, who cannot read or write, . .	8
Who have been strictly temperate, ...	6
" " moderate drinkers, ...	163
" " habitually intemperate, ...	
" " married, ...	59
" " in prison before, ...	55

COMMITTED.

For Adultery, . .	2	For Civil process, . .	1
Assault, . .	7	Defrauding, . .	3
Attempt at rape, .	2	Drunkenness, . .	79
Bastardy, . .	1	Horse stealing, .	2
Breach of the peace, .	3	House breaking, .	2
Burglary, . .	7	Injury to property, .	1

For Larceny,	22	For Tramps,	8
Neglect of family,	1	Trespas'g on R. R. property,	4
Rape,	2	Vagrancy,	10
Resisting officer,	1	Violation of liquor law,	6
Stealing from the person,	3		
Taking horse without leave,	2	Total,	169

Average number in confinement during the year, . . $20\frac{10}{13}$

DISCHARGED.

By Bail or recognizance,	4	Sent to state prison,	15
Payment of fine and costs,	40	Escaped and not retaken,	2
Expiration of sentence,	79	By process not specified above,	2
State's attorney,	6	Died,	1
County commissioners,	3		
Sent to court and not returned,	10	Total,	162

Returns concerning JAILS for the County of LITCHFIELD, for the year ending June 30, 1889.

[Certified by Lyman Dunning and S. N. Pettibone, County Commissioners.]

Number in jail, June 30, 1888,	32	
Committed during the year,	162	194
Discharged during the year,		172
Number remaining in jail, June 30, 1889,		22

COLOR AND SEX.

White,	Males,	138	Females,	8	Total white,	146
Colored,	Males,	16	Females,	0	Total colored,	16
		154		8		162

AGE.

Over 21 years,	Males,	148	Females,	8	Total adults,	156
Under 21 years,	Males,	6	Females,	0	Total minors,	6
		154		8		162

NATIVITY, ETC.

Natives of this state,	58
" other states,	58
" other countries,	46
" this state, who cannot read or write,	15
" other states, who cannot read or write,	10
" other countries, who cannot read or write,	13
Who have been strictly temperate,	9
" " moderate drinkers,	116
" " habitually intemperate,	37
" " married,	45
" " in prison before,	71

COMMITTED.

For Adultery,	2	For Injury to property,	1
Assault,	17	Keeping house of ill-fame,	1
Assault with intent to kill,	1	Larceny,	15
Attempt at rape,	1	Lewd conduct,	1
Breach of the peace,	10	Rape,	4
Burglary,	7	Stealing from the person,	1
Common drunkards,	1	Tramps,	11
Cruelty to animals,	1	Vagrancy,	29
Defrauding,	4	All other offenses,	1
Drunkenness,	53		
Frequenting house of ill-fame,	1	Total,	162

Average number in confinement during the year, . . $33\frac{45}{100}$

DISCHARGED.

By Bail or recognizance,	9	Sent to court and not returned,	1
Payment of fine and costs,	21	Sent to state prison,	23
Expiration of sentence,	94	Escaped and not retaken,	1
State's attorney,	12		
County commissioners,	11	Total,	172

Returns concerning JAILS for the County of MIDDLESEX for the year ending June 30, 1889.

[Certified by Charles L. Griswold, A. M. Wright and J. M. Hubbard, County Commissioners.]

Number in jail, June 30, 1888,	22	
Committed during the year,	155	177
Discharged during the year,		164
Number remaining in jail, June 30, 1889,		13

COLOR AND SEX.

White,	Males,	143	Females,	8	Total white,	151
Colored,	Males,	4	Females,	0	Total colored,	4
		147		8		155

AGE.

Over 21 years,	Males,	137	Females,	6	Total adults,	143
Under 21 years,	Males,	10	Females,	2	Total minors,	12
		147		8		155

NATIVITY, ETC.

Natives of this state,	80
" other states,	18
" other countries,	57
" this state, who cannot read or write,	8
" other states, who cannot read or write,	3
" other countries, who cannot read or write,	17

Who have been strictly temperate,	9
" " moderate drinkers,	76
" " habitually intemperate,	70
" " married,	55
" " in prison before,	124

COMMITTED.

For Assault,	24	For Keeping house of ill-fame,	2
Assault with intent to kill,	2	Murder,	4
Attempt at rape,	3	Obtaining goods on false pretense,	1
Bastardy,	1	Poisoning,	1
Breach of the peace,	7	Vagrancy,	4
Burglary,	3	All other offenses,	7
Common drunkards,	3		
Drunkenness,	91		
Embezzlement,	1	Total,	155
Horse stealing,	1		

Average number in confinement during the year, *

DISCHARGED.

By Payment of fine and costs,	19	Sent to court and not returned,	3
Expiration of sentence,	133	Sent to state prison,	8
Transferred to other jails,	1		
		Total,	164

Returns concerning JAILS for the County of TOLLAND, for the year ending June, 30, 1889.

[Certified by M. P. J. Walker and J. A. Brown, County Commissioners.]

Number in jail, June 30, 1888,	10	
Committed during the year,	79	89
Discharged during the year,		81
Number remaining in jail, June 30, 1889,		8

COLOR AND SEX.

White,	Males,	76	Females,	2	Total white,	78
Colored,	Males,	1	Females,	0	Total colored,	1
		77		2		79

AGE.

Over 21 years,	Males,	71	Females,	2	Total adults,	76
Under 21 years,	Males,	6	Females,	0	Total minors,	3
		77		2		79

NATIVITY, ETC.

Natives of this state,	*
" other states,	*
" other countries,	38
" this state, who cannot read or write,	*

* Not returned.

Natives of other states, who cannot read or write,	*
" other countries, who cannot read or write,	6
Who have been strictly temperate,	2
" " moderate drinkers,	*
" " habitually intemperate,	*
" " married,	51
" " in prison before,	21

COMMITTED.

For Assault,	2	For Neglect of family,	1
Assault with intent to kill,	1	Resisting officer,	2
Breach of the peace,	20	Setting fire,	1
Burglary,	4	Stealing from the person,	4
Common drunkards,	4	Tramps,	8
Defrauding,	1	Trespass on R. R.,	1
Drunkenness,	21	Violation of liquor law,	5
Horse stealing,	1		—
Injury to property,	2	Total,	79
Larceny,	1		

Average number in confinement during the year,	19

DISCHARGED.

By Payment of fine and costs,	12	Sent to state prison,	5
Expiration of sentence,	42	Escaped and not retaken,	1
State's attorney,	20		—
County commissioners,	1	Total,	81

*Not returned.

COLOR, AGE, SEX, NATIVITY, HABITS.

		Hartford.	New Haven.	New London.	Fairfield.	Windham.	Litchfield.	Middlesex.	Tolland.	Total.
MALES.	White,	1,298	2,338	756	1,513	160	138	143	76	6 422
	Colored,	39	139	22	59	4	16	4	1	284
	Adults,	1,186	1,914	700	1,481	143	148	137	71	5,780
	Minors,	151	563	78	91	21	6	10	6	926
	Total Males,	1,337	2,477	778	1,572	164	154	147	77	6,706
FEMALES.	White,	152	312	35	161	4	8	8	2	682
	Colored,	8	18	8	13	1	0	0	0	48
	Adults,	149	278	41	162	5	8	6	2	651
	Minors,	11	52	2	12	0	0	2	0	79
	Total Females,	160	330	43	174	5	8	8	2	730
	Total,	1,497	2,807	821	1,746	169	162	155	79	7,436
Natives of this state,		533	1,143	307	527	38	58	80	‡	
Natives of other states,		292	581	241	426	48	58	18	‡	
Natives of other countries,		672	1,083	273	793	83	46	57	38	3,045
Total,		1,497	2,807	821	1,746	169	162	155	79	7,436
Strictly temperate,		7	*	*	67	6	9	9	2	
Moderate drinkers,		1,370	*	143	377	163	116	76	*	
Habitually intemperate,		120	*	205	1,312		37	70	*	

* Not returned.
† Error in return.
‡ Natives of other states and countries 41.

OFFENSES.

FOR WHAT OFFENSES COMMITTED.	Hartford.	New Haven.	New London.	Fairfield.	Windham.	Litchfield.	Middlesex.	Tolland,	Total.
Abortion,	.....	.....	....	.....	....	...	....	..	.....
Adultery,	7	2	....	3	2	2	....	..	16
Assault,	120	51	10	151	7	17	24	2	382
Assault with intent to kill,	6	5	10	16	....	1	2	1	41
Attempt at rape,	1	4	....	.....	2	1	3	..	11
Bastardy,	2	2	1	1	1	....	1	..	8
Bigamy,	.....	1	....	.....	....	....	....	..	1
Breach of the peace,	132	383	71	238	3	10	7	20	864
Burglary,	32	51	22	51	7	7	3	4	177
Civil process,	12	11	5	3	1	....	....	..	32
Common drunkard,	28	27	2	17	....	1	3	4	82
Common prostitute,	4	2	....	37	....	....	....	..	43
Contempt of court,	2	4	1	2	....	....	....	..	9
Cruelty to animals,	8	14	1	.....	....	1	....	..	24
Defrauding,	20	17	1	11	3	4	....	1	57
Drunkenness,	717	1,566	471	736	79	53	91	21	3,734
Embezzlement,	13	10	3	2	....	....	1	..	29
Forgery	5	5	1	3	....	....	....	..	14
Fornication,	5	9	....	2	....	....	....	..	16
Frequenting house of ill-fame,	11	17	7	.....	...	1	....	..	36
Horse stealing,	4	4	....	3	2	....	1	1	14
House breaking,	1	.....	4	.....	2	....	....	..	7
Injury to property,	12	18	1	18	1	1	....	2	53
Insane,	.....	.....	....	.....	....	....	....	..	.....
Keeping house of ill-fame,	5	3	2	6	....	1	2	..	19
Larceny,	163	193	44	122	22	15	....	1	560
Lewd conduct,	7	61	1	1	....	1	....	..	71
Making or passing counterfeit money,	1	1	....	.....	....	....	....	..	2
Malicious injury,	10	.....	2	.....	....	....	....	..	12
Manslaughter,	2	.....	....	10	....	....	....	..	12
Murder,	4	2	....	4	....	....	4	..	14
Neglect of family,	15	27	5	15	1	....	....	1	64
Obtaining goods on false pretense,	7	1	9	.....	....	....	1	..	18
Perjury,	.....	.....	....	.....	....	....	....	..	.....
Rape,	.....	2	....	1	2	4	....	..	9
Resisting officer,	10	65	9	22	1	....	....	2	109
Robbery,	5	3	34	27	....	....	....	..	69
Seduction,	.....	2	....	2	....	....	....	..	4
Setting fires,	4	1	1	3	....	....	....	1	10
Stealing from the person,	10	6	3	32	3	1	....	4	59
Taking horse without leave,	3	7	2	4	2	....	....	..	18
Tramps,	5	18	4	57	8	11	....	8	111
Trespass on R. R. property,	14	50	1	.....	4	....	....	1	70
Vagrancy,	57	104	83	113	10	29	4	..	400
Violation of liquor law,	8	2	10	11	6	....	....	5	42
All other offenses,	25	56	....	22	....	1	8	..	112
Total,	1,497	2,807	821	1,746	169	162	155	79	7,436

Receipts and Expenses of the Several Counties.

Receipts of the County of HARTFORD for the year ending June 30, 1889, *with a statement of the amounts due to the County on that date.*

Received for board of prisoners:	from the state,	$22,025.54
	from the United States,	22.72
	from City of Hartford,	284.43
	on civil process,	59.74
from earnings of prisoners,		1,700.00
" sales at jails,		304.00
" sales,		48.00
" licenses, 5 per cent.,		5,206.67
" license transfered,		138.00
" license forfeited bonds,		600.00
" license, other receipts,		12.00
" interest,		451.60
" towns, for county home,		1,063.33
" state, for county home,		3,045.29
" loan acct., county home,		12,000.00
Total,		$46,961.32
Received from key fees, by sheriff,		$783.50

Expenditures of the County of HARTFORD for the year ending June 30, 1889, *with a statement of the indebtedness on that date.*

Paid for provisions,	$8,378.14
" clothing,	274.66
" bedding,	498.56
" fuel,	1,618.68
" lights,	135.87
" medicines,	159.86
" medical attendance,	150.00
" salary of jailer,	1,000.00
" salary of assistants,	3,706.00
" salary of chaplain,	100.00
" salary of county commissioners,	3,264.10
county treasurer,	300.00
county auditors,	60.00
expenses of county home,	7,108.62
for building and repairs of jails,	998.77
" furniture at jail,	38.25
" board of sick prisoners,	32.46
" interest on loan,	1,514.90
on county loan,	4,000.00
for advertising,	58.00
" water,	294.37
" telephone,	42.30
" county bar library,	300.00
" court house repairs, janitor, etc.,	1,925.41
" license blanks,	87.00
" license expenses, miscellaneous,	134.58

Paid for license revocation expenses,	$58.09
" purchase of county home,	12,835.75
" incidentals, commissioners office,	102.17
Total,	$49,176.54

INDEBTEDNESS OF THE COUNTY.

Accepted orders on treasury, bearing 4 per cent. interest,	$46,000.00

Receipts of the County of NEW HAVEN for the year ending June 30, 1889, *with a statement of the amounts due to the County on that date.*

Received for board of prisoners: from the state,	$29,922.74
" " United States,	243.36
on civil process,	37.55
on appeal,	6.75
from earnings of prisoners,	2,950.00
" sales at jail,	485.52
" licenses, 5 per cent.,	11,468.25
" license transfers,	257.00
" rent of law chambers,	3,191.00
Total,	$48,562.17

AMOUNT DUE TO THE COUNTY.

From state, for board of prisoners,	$4,247.18
" United States, for board of prisoners,	29.12
Total,	$4,276.30

Expenditures of the County of NEW HAVEN for the year ending June 30, 1889, *with a statement of the indebtedness on that date.*

Paid for provisions,	$14,034.65
" clothing,	282.57
" bedding,	432.49
" fuel,	1,937.85
" lights,	216.45
" medicines,	489.98
" medical attendance,	250.00
" salary of jailer,	300.00
" salary of assistants,	3,809.39
" salary of chaplain,	125.00
" salary of county commissioners,	3,840.24
county treasurer,	300.00
county auditors,	140.00
for alteration of county home,	603 27
" building and repairs of jails,	4,585.43
" shoes,	274.81
" transportation,	44.30
" stationary and stamps,	173.06
" water,	463.92
" ice,	183.33
" telephone,	64.35
" janitor, court house,	1,200.00

Paid for engineer, court house,	$660.00
" coal and wood,	297.27
" court house repairs,	1,553.90
" court house incidental,	225.57
" office incidentals,	55.35
" court house furniture,	169.19
" Law chamber repairs,	223.49
" Insurance,	216.00
" advertising, printing, etc.,	173.87
" gas,	15.60
" electric time,	24.27
" revocation costs,	373.38
" court record,	38.62
" water,	94.48
" county appropriation,	275.00
Total,	$38,147.08

Receipts of the County of NEW LONDON for the year ending June 30, 1889, *with a statement of the amounts due to the County on that date.*

Received for board of prisoners: from the state,	$10,503.58
" " United States,	37.44
from earnings of prisoners,	1,262.56
" licenses, 5 per cent.,	1,953.60
" license transfers,	10.00
" towns, for county home,	452.56
" state, for county home,	1,949.22
" private person,	24.43
" court houses,	9.18
Total,	$16,202.57

Expenditures of the County of NEW LONDON for the year ending June 30, 1889, *with a statement of the indebtedness on that date.*

Paid for provisions,	$3,313.12
" clothing,	245.43
" bedding,	123.46
" fuel,	767.44
" lights,	30.30
" medicines,	237.28
" medical attendance,	48.00
" salary of jailers,	1,200.00
" salary of assistants,	1,000.29
" salary of chaplain,	25.00
" salary of county commissioners,	1,482.44
county treasurer,	180.00
county auditor,	30.00
for expenses of county home,	2,814,22
" building and repairs of jails,	981.21
" inspecting boilers,	10.00
" barn expenses,	550.68
" blacksmithing,	15.63

Paid for water,	$81.50
" ice,	51.38
" material for labor,	150.82
" telephone,	33.15
" court houses,	1,331.91
" insurance,	270.00
" law library,	100.00
" license revocations,	33.29
" printing and stationery,	109.06
" attorney fees,	25.00
" miscellaneous,	320.98
" land purchased,	76.00
Total,	$15,637.59

Receipts of the County of FAIRFIELD for the year ending June 30, 1889, *with a statement of the amounts due to the County on that date.*

Received for board of prisoners : from the state,	$16,542.92
on civil process,	11.25
from earnings of prisoners,	900.00
" key fees,	891.00
" sales at court house,	323.00
" licenses, 5 per cent.,	7,046.14
" licenses forfeited bonds,	490.00
" county tax,	10,112.97
" interest,	38.59
Total,	$36.355.87

AMOUNT DUE TO THE COUNTY.

From state, for board of prisoners,	$2,578.77
" key fees,	152.50
" labor of prisoners,	75.00
Total,	$2,806.27

Expenditures of the County of FAIRFIELD for the year ending June 30, 1889, *with a statement of the indebtedness on that date.*

Paid for provisions,	$6,536.65
" clothing,	960.24
" bedding,	216.22
" fuel,	1,363.78
" lights,	340.99
" medicines,	163.25
" medical attendance,	162.00
" salary of jailers,	2,399.88
" salary of assistants,	1,164.13
" salary of county commissioners,	2,790.04
county treasurer,	175.00
county auditor,	100.00
expenses of county home school for four years,	351.06

Paid for building and repairs of jails,	$442.80
" inspection of jails,	397.44
" insurance,	25.00
" water and ice,	377.36
" horse feed,	240.20
" key fees,	891.00
" court expenses,	3,532.95
" commissioners' court expenses,	366.62
" stationery, blanks and postage at jail,	49.54
" stationery, blanks and postage at commissioners office,	260.18
" collecting forfeited bonds,	81.88
" law library,	300.00
" legal advice,	75.00
" building and repairs, court houses,	1,809.59
" furniture, superior court,	1,749.93
" interest,	206.17
" contracts account legislative committee,	22,249.49
" supplies at jail,	482.29
" sundries, commissioners' office,	396.87
" miscellaneous,	264.77
Total,	$50.922.32

Receipts of the County of WINDHAM for the year ending June 30, 1889, *with a statement of the amounts due to the County on that date.*

Received for board of prisoners: from the state,	$2,417.07
from earnings of prisoners,	1,659.49
" board of transient persons,	42.25
" sales of produce at jails,	392.55
" licenses, 5 per cent.,	277.90
" license transfers,	6.00
" county tax,	8,454.99
" towns, for county home,	676.56
" state, for county home,	1,185.92
" private board, at county home,	7.00
" produce sold at county home,	323.37
" rent,	2.00
" loan, Brooklyn savings bank,	8,000.00
" rent of land,	74.00
Total,	$23,519.10

AMOUNT DUE TO THE COUNTY.

From state, for board of prisoners,	$222.46
" towns, for support of children,	169.72
" state, for support of children,	272.00
Total,	$664.18

Expenditures of the County of WINDHAM for the year ending June 30, 1889, *with a statement of the indebtedness on that date.*

Paid for provisions,	$1,418.24
" clothing,	159.85
Paid for bedding and furnishings,	$65.95
" fuel,	110.50
" lights,	7.84
" medicines and medical attendance,	28.82
" salary of jailer,	800.00
" salary of assistants,	300.00
" salary of chaplain,	20.00
" salary of county commissioners,	561.42
county treasurer,	40.00
county auditors,	10.00
expenses of county home,	2,545.33
for building and repairs of jails,	55.14
" escaped prisoners,	23.00
" grain,	91.82
" hardware,	64.68
" blacksmithing,	45.54
" house work,	156.00
" out-door labor,	35.12
" fertilizers,	66.05
" live stock,	150.00
" telephone,	40.00
" rent of land,	85.00
" prosecutions,	35.03
" county home, school tax,	189.65
" interest,	745.10
" printing,	46.00
" insurance,	45.00
" record books,	41.00
" rent,	1.92
" rent of office,	50.00
" repairs of court house,	.55
" miscellaneous,	83.33
" outstanding orders,	14,902.18
Total,	$23,020.06

INDEBTEDNESS OF THE COUNTY.

Outstanding orders, at 4 per cent.,	$1,500.00
Outstanding orders, at 4½ per cent.,	8,000.00
Total,	$9,500.00

Receipts of the County of LITCHFIELD for the year ending June 30, 1889, with a statement of the amounts due to the County on that date.

Received for board of prisoners: from the state,	$4,103.42
from earnings of prisoners,	1,063.14
" sales at jail,	42.84
" board of individuals,	38.00
" licenses, 5 per cent.,	502.41
" towns, for county home,	893.60
" state, for county home,	768.28
Total,	$7,411.69

AMOUNT DUE TO THE COUNTY.

From state, for board of prisoners,	$404.36
" labor of prisoners,	903.91
" key fees,	13.50
Total,	$1,321.77

Expenditures of the County of LITCHFIELD, for the year ending June 30, 1889, with a statement of the indebtedness on that date.

Paid for provisions,	$2,032.77
" clothing,	162.10
" bedding,	35.05
" fuel,	378.38
" lights,	20.79
" medicines,	62.19
" medical attendance,	27.00
" salary of jailer,	540.00
" salary of assistants,	304.50
" salary of county commissioners,	584.20
county auditors,	12.06
expenses of county home,	2,841.21
for building and repairs of jails,	96.47
" supplies,	645.71
" stationery, printing and advertising,	105.45
" freights,	13.12
" team work,	239.25
" horse,	175.00
" telephone,	60.00
" escaped prisoners,	12.89
" returning prisoner,	1.60
" rents, court rooms,	837.50
" orders, 1888,	1,991.69
Total,	$11,178.93

INDEBTEDNESS OF THE COUNTY.

Due First National Bank of Litchfield at — per cent. interest,	$3,542.57
" on unpaid orders,	670.20
Total,	$4,212.77

Receipts of the County of MIDDLESEX for the year ending June 30, 1889, *with a statement of the amounts due to the County on that date.*

Received for board of prisoners: from the state,	$2,636.09
from sales at jail,	7.55
" licenses, 5 per cent.,	814.42
" license transfers,	6.00
" county tax,	9,477.47
" towns, for county home,	2,028.75
" state, for county home,	$280.53
" individuals,	258.85
" over payment refunded,	24.55
Total,	$15,534.21

AMOUNT DUE TO THE COUNTY.

From state, for board of prisoners,	366.45

Expenditures of the County of MIDDLESEX for the year ending June 30, 1889, *with a statement of the indebtedness on that date.*

Paid for provisions,	$2,216.48
" clothing,	222.52
" bedding,	41.25
" fuel,	400.76
" lights, water and soap,	76.12
" medicines and medical attendance,	60.93
" salary of jailers,	1,123.12
" salary of assistants,	292.40
" salary of chaplain,	25.00
" salary of county commissioners,	1,319.97
county treasurer,	50.00
county auditors,	40.00
expenses of county home,	4,557.71
for building and repairs of jails,	249.22
" printing,	69.75
" farm expenses,	484.90
" rent of office,	590.90
" court house repairs,	45.82
" transfer of prisoners,	411.14
" freights and transportation,	145.62
" household implements,	82.73
" miscellaneous,	154.19
" interest,	185.00
" notes,	1,000.00
Total,	$13,845.53

INDEBTEDNESS OF THE COUNTY.

Notes at 5 per cent. interest,	$3,000.00

Receipts of the County of TOLLAND for the year ending June 30, 1889, *with a statement of the amounts due to the County on that date.*

Received for board of prisoners: from the state,	$2,076.57
from licenses, 5 per cent.,	353.65
" forfeited bonds,	300.00
" county tax,	5,884.61
" towns, for county home,	509.47
" state, for county home,	865.59
" sale of pork,	42.42
" loans,	1,850.00
Total,	$11,882.31

AMOUNT DUE TO COUNTY.

From state, for board of prisoners,	$18.00
Unpaid taxes,	274.30
For water rent,	25.00
Total,	$317.30

Expenditures of the County of TOLLAND for the year ending June 30, 1889, *with a statement of the indebtedness on that date.*

Paid for provisions,	$2,076 57
" clothing,	60.06
" bedding,	19.02
" fuel,	122.30
" medicines,	5.20
" medical attendants,	14.50
" salary of jailer,	425.00
" salary of county commissioners,	765.39
county treasurer,	50.00
county auditors,	35.00
expenses of county home,	1,634.27
for repairs of jails,	269.51
" repairs of county buildings,	177.14
" repairs of temporary home,	98.37
" repairs of court house,	3.65
" supplies for jail,	21.83
" stationery,	.99
" water rent,	50.00
" insurance,	120.00
" orders,	2,525.00
" interest,	109.83
" miscellaneous bills,	80.76
" costs, license case,	15.00
Total,	$8,679.39

INDEBTEDNESS OF THE COUNTY.

Orders at 5 per cent. interest,	$600.00
" 6 per cent. interest,	750.00
Interest on orders,	96.86
Salary of jailer,	24.56
Total,	$1,471.42

REPORTS OF COUNTY COMMISSIONERS,

FOR THE YEAR ENDING JUNE 30, 1889.

IN RELATION TO LICENSES.

TOWNS.	No. of Liquor Licenses.		Amounts Received from Liquor Licenses.		No. of Beer Licenses.		Amounts Received from Beer Licenses.		No. of Druggist's Licenses.	Amounts Received from Druggist's Licenses.	Total Number of Licenses.	Total Amount Received.	Amount Paid County Treasurer.	Amount Paid Treasurer of Town.
	Wholesale.	Retail.	Wholesale.	Retail.	Wholesale.	Retail.	Wholesale.	Retail.						
HARTFORD CO.														
Hartford,	4	207	$1,200.00	$59,850.00	2	8	$300.00	$938.00	27	$1,350.00	248	$63,638.00	$3,181.90	$60,337.35*
Avon,	..	4	.....	400.00	..	..	....	.....	..	.....	4	400.00	20.00	380.00
Bristol,	..	13	....	2,500.00	..	..	....	.....	4	200.00	17	2,700.00	135.00	2,565.00
Burlington,	..	9	.....	851.00	..	..	....	.....	..	.....	9	851.00	42.55	808.45
Canton,	..	..	.....	....	..	..	....	.....	2	20.00	2	20.00	1.00	19.00
East Granby,	..	2	.....	200.00	..	..	....	.....	..	....	2	200 00	10.00	190.00
East Hartford,	..	4	.....	800.00	..	1	....	34.00	2	100.00	7	934.00	46.70	887.30
East Windsor,	..	11	.....	2,001.00	..	..	....	.....	..	....	11	2,001.00	100.05	1,900.95
Enfield,	..	21	.....	4,134.00	..	1	....	100.00	3	112.00	25	4,346.00	217.30	4,128.70
Farmington,	..	10	.....	1,834.00	..	..	....	.....	2	22.00	12	1,856.00	92.80	1,763.20
Glastonbury,	..	..	.....	....	..	..	....	....	1	10.00	1	10.00	.50	9.50
Granby,	..	1	.....	100.00	..	..	....	.....	..	.....	1	100 00	5.00	95.00
Manchester,	..	10	.....	1,952.00	..	1	....	34.00	8	400.00	19	2,386.00	119.30	2,266.70
New Britain,	..	78	.....	18,857.00	..	11	....	1,324.00	9	374.00	98	20,555.00	1,027.77	19,527.23
Plainville,	..	10	.....	1,000.00	..	2	....	80.00	2	100.00	14	1,180.00	59.00	1,121.00
Rocky Hill,	..	1	.....	100.00	..	..	....	.....	..	.....	1	100.00	5.00	95·00
Simsbury,	..	3	.....	300.00	..	..	....	.....	..	.....	3	300.00	15.00	285.00
Southington,	..	..	.....	....	..	..	....	.....	3	36.00	3	36.00	1.80	34.20
South Windsor,	..	1	.....	100.00	..	..	....	.....	..	.....	1	100.00	5.00	95.00
Suffield,	..	3	.....	475.00	..	.	....	.....	..	.....	3	475.00	23.75	451.25
Wethersfield,	..	..	.....	....	..	2	....	75.00	2	100.00	4	175.00	8.75	166.25
Windsor,	..	6	.....	1,200.00	..	..	....	.....	1	50.00	7	1,250.00	62.50	1,187.50
Windsor Locks,	..	5	.....	500.00	..	..	....	.....	2	20.00	7	520 00	26.00	494.00
Total,	4	399	$1,200.00	$97,154 00	2	26	$300.00	$2,585.00	68	$2,894.00	499	$104,133.00	$5,206.67	$98,807.58

* Due Hartford, June 30th, 1889, $118.75.

TOWNS.	No. of Liquor Licenses		Amounts Received from Liquor Licenses.		No. of Beer Licenses.		Amounts Received from Beer Licenses.		Number of Druggist's Licenses.	Amounts Received from Druggist's Licenses.	Total Number of Licenses.	Total Amount Received.	Amount Paid County Treasurer.	Amount Paid Treasurer of Town.
	Wholesale.	Retail.	Wholesale.	Retail.	Wholesale.	Retail.	Wholesale.	Retail.						
New Haven Co.														
New Haven,	..	399	....	$112,800.00	..	24	....	$3,295.00	45	$1,741.00	468	$117,836.00	$5,891.80	$111,944.20
Ansonia,	..	1	....	125.00	..	..	....	....	..	....	1	125.00	6.25	118.75
Beacon Falls,	..	3	....	300.00	..	..	....	....	..	....	3	300.00	15.00	285.00
Branford,	..	19	....	3,285.00	..	1	....	100.00	2	60.00	22	3,445.00	172.25	3,272.75
Cheshire,	..	2	....	200.00	..	..	....	....	1	50.00	3	250.00	12.50	237.50
Derby,	..	88	....	21,395.00	..	1	....	95.00	7	350.00	96	21,840.00	1,092.00	20,748.00
East Haven,	..	2	....	150.00	..	3	....	121.00	..	....	5	271.00	13 55	257.45
Guilford,	..	2	....	200.00	..	..	....	....	1	10.00	3	210.00	10.50	199.50
Hamden,	..	7	....	1,270.00	..	..	....	....	1	50.00	8	1,320.00	66.00	1,254 00
Meriden,	..	104	....	25,510.00	..	4	....	460.00	11	474.00	119	26,444.00	1,322.20	25,121.80
Milford,	..	7	....	1,400.00	..	..	....	....	1	50.00	8	1,450.00	72.50	1,377.50
Naugatuck,	..	30	....	5,955.00	..	1	....	75.00	1	10.00	32	6,040.00	302.00	5,738.00
Orange,	..	19	....	2,250.00	..	2	....	155.00	1	10.00	22	2,415 00	12,075.00	2,294.25
Oxford,	..	2	....	200.00	..	..	....	....	..	....	2	200.00	10.00	190.00
Seymour,	..	15	....	1,402.00	..	..	....	....	2	100.00	17	1,502.00	75.10	1,426.90
Wallingford,	..	21	....	4,030.00	..	..	....	....	2	100.00	23	4,130.00	206.50	3,923.50
Waterbury,	..	169	....	39,995.00	..	10	....	930.00	14	662.00	193	41,587.00	2,079.35	39,507.65
Total,	..	890	....	$220,467.00	..	46	....	$5,231.00	89	$3,667.00	1,025	$229,365.00	$11,468.25	$217,896.75
New London Co.														
New London,	2	62	$500.00	$13,019.00	..	3	....	$350.00	5	$136.00	72	$14,005.00	$700.25	$13,304.75
Norwich,	4	93	1,200.00	20,482.00	2	1	$300	150.00	9	450 00	109	22,582.00	1,129.10	21,452.90
Colchester,	..	12	...	1,200.00	..	..	....	....	1	50.00	13	1,250.00	62.50	1,187.50
Franklin,	..	2	....	200.00	..	..	....	....	..	....	2	200,00	10.00	190.00
Groton,	..	..	....	....	..	..	....	....	2	24.00	2	24.00	1.20	22.80
Preston,	..	2	....	200.00	..	2	....	100.00	..	....	4	300.00	15.00	285.00
Sprague,	..	6	....	600.00	..	..	....	....	..	....	6	600.00	30.00	570.00
Stonington,	..	1	....	75.00	..	..	....	....	3	36.00	4	111.00	5.55	105.45
Total,	6	178	$1,700.00	$35,776.00	2	6	$300	$600.00	20	$696.00	212	$39,072.00	$1,963.60	$37,118.40
											Transfers,		10.00	

FAIRFIELD CO.														
Bridgeport,	10	244	$2,745.00	$69,728.00	8	2	$1,093.50	$325.00	21	$974.00	285	$74,865.50	....	$71,122.23
Brookfield,	..	3	....	300 00	..	..	...	...	..	....	3	300.00	....	285.00
Danbury,	5	46	1,920.00	12,382.00	..	..	....	....	10	500.00	61	14,802.00	....	14,061.90
Darien,	..	4	....	350 00	..	..	....	....	..	....	4	350.00	....	332.50
Fairfield,	..	5	....	1,274.00	..	..	....	....	1	50.00	6	1,324.00	....	1,257.80
Greenwich,	..	25	....	6,971.00	1	..	150.00	....	2	100.00	28	7,221.00	....	6,859.95
Huntington,	1	7	329.00	1,700.00	..	..	....	....	1	50.00	9	2,079.00	....	1,975.05
New Canaan,	..	..	....	....	..	..	....	....	1	12.00	1	12.00	....	11.40
Newtown,	1	8	350.00	2,350.00	..	..	....	....	1	50.00	10	2,750.00	...	2,612.50
Norwalk,	4	45	1,400.00	12,982.00	1	1	150.00	75.00	8	400.00	59	15,007.00	....	14,256.65
Stamford,	6	51	1,766.00	14,714.00	2	3	286.50	167.00	9	412.00	71	17,345.50	....	16,478.23
Stratford,	..	8	....	2,077.00	..	..	....	....	1	50.00	9	2,127.00	....	2,020.65
Westport,	..	9	....	2,690.00	..	..	....	....	1	50.00	10	2,740.00	....	2,603.00
Total,	27	455	$8,510.00	$127,518.00	12	6	$1,680.00	$567.00	56	$2,648.00	556	$140,923.00	$7,046.14	$133,876.86
LITCHFIELD CO.														
Litchfield,	..	2	....	$266.66	..	3	....	$250.00	3	$150.00	8	$666.66	$33.33	$633.33
Barkhamsted,	..	1	...	100.00	..	..	....	....	..	....	1	100.00	5.00	95.00
Canaan,	..	3	....	300.00	..	..	....	....	..	....	3	300.00	15.00	285.00
Cornwall,	.	1	....	100.00	..	..	....	....	..	....	1	100.00	5.00	95.00
Kent,	..	1	....	100.00	..	..	....	....	..	....	1	100.00	5.00	95.00
New Hartford,	..	4	....	800.00	..	..	....	....	1	50.00	5	850.00	42.50	807.50
New Milford,	..	8	....	1,600.00	..	1	....	100.00	2	100.00	11	1,800 00	90.00	1,710.00
Norfolk,	..	..	....	....	..	..	....	....	1	50.00	1	50.00	2.50	47.50
North Canaan,	..	..	....	....	..	..	....	....	1	12.00	1	12.00	.60	11.40
Plymouth,	..	..	....	....	..	..	....	....	2	24.00	2	24.00	1.20	22.80
Salisbury,	..	..	....	....	..	..	....	....	2	24.00	2	24.00	1.20	22.80
Sharon,	..	3	....	300.00	..	1	....	50.00	1	10.00	5	360.00	18.00	342.00
Thomaston,	..	11	....	2,200.00	..	2	....	200.00	3	110.00	16	2,510.00	125.50	2,384.50
Torrington,	..	9	....	1,800.00	..	..	....	...	3	150.00	12	1,950.00	97.50	1,852.50
Winchester,	..	2	....	700.00	..	..	....	....	5	241.67	7	941.67	47.08	894.59
Woodbury,	..	2	....	200.00	..	..	....	....	2	60.00	4	260.00	13.00	247.00
Total,	..	47	....	$8,466.66		7		$600.00	26	$981.67	80	$10,048.33	$502.41	$9,545.92

TOWNS.	No. of Liquor Licenses.		Amounts Received from Liquor Licenses.		No. of Beer Licenses.		Amounts Received from Beer Licenses.		Number of Druggist's Licenses.	Amounts Received from Druggist's Licenses.	Total Number of Licenses.	Total Amount Received.	Amount Paid County Treasurer.	Amount Paid Treasurer of Town.
	Wholesale.	Retail.	Wholesale.	Retail.	Wholesale.	Retail.	Wholesale.	Retail.						
WINDHAM CO.														
Eastford,	..	2	....	$200.00	..	..	....	....	..	...	2	$200.00	$10.00	$190.00
Killingly,	..	..	....	....	..	..	....	....	4	$48.00	4	48.00	2.40	45.60
Plainfield,	..	..	....	...	..	..	....	....	2	24.00	2	24.00	1.20	22.80
Putnam,	..	..	....	....	..	..	....	....	3	36.00	3	36.00	1.80	34.20
Sterling,	..	2	....	200.00	..	..	....	....	..	....	2	200.00	10.00	190.00
Windham,	..	19	....	4,650.00	..	1	....	100.00	6	300.00	26	5,050.00	252.50	4,797.50
Total,	..	23	....	$5,050.00	..	1	....	$100.00	15	$408.00	39	$5,558 00	$277.90	$5,280.10
MIDDLESEX CO.														
Middletown,	..	40	....	$11,150.00	..	3	....	$466.67	6	$279.17	49	$11,895.84	$594.79	$11,301.05
Chatham,	..	..	....	....	..	..	....	....	1	12.00	1	12.00	.60	11.40
Chester,	..	2	....	200.00	..	..	....	....	..	....	2	200.00	10.00	190.00
Clinton,	..	..	....	...	..	..	....	....	1	12.00	1	12.00	.60	11.40
East Haddam,	..	4	....	900.00	..	..	....	....	..	....	4	900.00	45.00	855.00
Essex,	..	..	....	....	..	..	....	....	1	12.00	1	.12.00	.60	11.40
Old Saybrook,	..	6	....	491.66	..	1	....	50.00	..	...	7	541.66	27.08	514.58
Portland,	..	9	....	2,700.00	..	1	....	15.00	.	....	10	2,715.00	135.75	$2,579.25
Total,	..	61	...	$15,441.66	..	5	....	$531.67	9	$315.17	75	$16,288.50	$814.42	$15,474.08
TOLLAND CO.														
Bolton,	..	1	....	$100.00	..	..	....	....	..	....	1	$100.00	$5.00	$95.00
Coventry,	..	..	....	....	..	..	....	....	1	$12.00	1	12.00	.60	11.40
Ellington,	..	2	....	200.00	..	3	....	75.00	..	....	5	275.00	13.75	261.25
Somers,	..	3	....	300.00	..	..	....	....	..	....	3	300.00	15.00	285.00
Stafford,	..	..	....	....	..	..	....	....	3	36.00	3	36.00	1.80	34.20
Vernon,	..	28	....	5,800.00	..	3	....	300.00	5	250.00	36	6,350.00	317.50	6,032.50
Total,	..	34	...	$6,400.00	..	6	....	$375.00	9	$298.00	49	$7,073.00	$353.65	$6,719.35

SUMMARY.

TOWNS.	No. of Liquor Licenses.		Amounts Received from Liquor Licenses.		No. of Beer Licenses.		Amounts Received from Beer Licenses.		No. of Druggist's Licenses.	Amounts Received from Druggist's Licenses.	Total Number of Licenses.	Total Amount Received.	Amount Paid County Treasurer.	Amount Paid Treasurer of Town.
	Wholesale.	Retail.	Wholesale.	Retail.	Wholesale.	Retail.	Wholesale.	Retail.						
Hartford,....	4	399	$1,200.00	$97,154.00	2	26	$300.00	$2,585.00	68	$2,894.00	499	$104,133.00	$5,206.67	$98,807.58*
New Haven,..	..	890	....	220,467.00	..	46	....	5,231.00	89	3,667.00	1,025	229,365.00	11,468.25	217,896.75
New London,	6	178	1,700.00	35,776.00	2	6	300.00	600.00	20	696.00	212	39,072.00	1,963 60	37,118.40
Fairfield, ...	27	455	8,510.00	127,518.00	12	6	1,680.00	567.00	56	2,648.00	556	140,923.00	7,046.14	133,876.86
Windham,...	..	23	....	5,050.00	..	1	....	100.00	15	408.00	39	5,558.00	277.90	5,280.10
Litchfield,...	..	47	....	8,466.66	..	7	....	600.00	26	981.67	80	10,048.33	502.41	9,545.92
Middlesex,...	..	61	....	15,441.66	..	5	..	531.67	9	315.17	75	16,288.50	814.42	15,474.08
Tolland,.....	..	34	....	6,400.00	..	6	....	375.00	9	298.00	49	7,073.00	353.65	6,719.35
Total,.....	37	2,087	$11.410.00	$516,273 32	16	103	$2,280.00	$10,589.67	292	$11,907.84	2,535	$552,460.83	$27,633.04	$524,719.04

* Due town of Hartford, $118.75.

REPORT

OF THE

DIRECTORS

OF THE

Connecticut State Prison,

TO THE

GENERAL ASSEMBLY,

JANUARY SESSION, 1891.

PRINTED BY ORDER OF THE LEGISLATURE.

HARTFORD, CONN.:
PRESS OF WILEY, WATERMAN & EATON, 354 AND 356 ASYLUM ST.
1891.

OFFICERS.

Directors,

FRANCIS WAYLAND, ...	New Haven.
EDWARD J. MURPHY, . . .	Hartford.
NATHAN M. BELDEN, ...	Wilton.
CYRUS B. NEWTON, ...	Stafford.
WILLIS S. BRONSON, ...	Hartford.
RANSOM T. HEWITT, ...	Wethersfield.
CHAS. A. ELLIOTT, ...	Clinton.

Warden,

SAMUEL E. CHAMBERLAIN.

Deputy Warden,

GEORGE E. BARSDEN.

Chaplain,

E. L. JAGGAR.

Physician,

A. S. WARNER, M. D.

Steward,

L. M. HORTON.

Gate Keeper,

HENRY G. RISLEY.

Hall Keeper,

E. M. WATSON.

Overseers,

T. W. Jones, Shop No. 1,
Francis Mullen, Shop No. 2,
M. D. Connors, Shop No. 3,
F. S. Martin, Shop No. 4,
W. B. DeBlois, Shop No. 5,
J. S. Doolittle, Shop No. 6.

Watchmen,

G. M. Strong,
A. L. Thomas,
J. E. Officer,
W. H. Mildrum,
W. E. Officer,
Henry Holmes,
W. F. Francis,
H. A. Harris.

Night Watchmen,

R. F. Hills.
D. McDonald.

Clerk and Hospital Steward,

G. H. Chaffee.

Matron,

Mrs. V. A. Crittenden.

State of Connecticut.

DIRECTORS' REPORT.

To the Honorable General Assembly of the State of Connecticut, January Session, 1891.

The Directors of the State Prison respectfully submit the following report:

The last Legislature appropriated twenty-five thousand dollars to build new workshops. The commissioners appointed by the Governor to contract for and superintend the erection of these buildings found it impossible, within this sum, to provide the motive power. The alternative presented to your directors was, therefore, to allow the shops to remain unused for a period of about eighteen months, or to supply the amount needed to put the buildings promptly in running order from prison funds. Your Directors were unanimously of the opinion that the interests of the State would best be served by a speedy and thorough equipment of the new shops, especially as at that juncture an opportunity occurred to purchase an excellent engine on most advantageous terms.

Your Directors believe that the results have amply vindicated the wisdom of this decision. Better light and ventilation, greater convenience in arrangement, increased economy of time, room, and power, have conduced in a very gratifying manner to the health and comfort of the convicts, have effected a considerable saving of money to the State, and have satisfied the reasonable expectations of the contractors.

The wonder now is that the foul, stifling atmosphere the narrow quarters and the wasteful inconvenience of the old, half-ruined workshops should have been tolerated for so many years.

A few added features are deemed necessary to put these buildings in the best condition.

1st. A vast amount of hand labor and much expense could be avoided if suitable elevators were provided.

2d. The convenience and efficiency of contractors and convicts would be largely promoted if both wings of the workshops were connected over the boiler-house.

3d. The annual cost of water now furnished to the prison for domestic use and for the supply of the workshops by the Hartford Water company, is twelve hundred dollars. The prison being at the termination of the main pipe, the water is often turbid and unwholesome. At the same time the distance from the source of supply increases the risk of accidents which would cut off or diminish the amount of water needed for daily consumption. It is believed that if a power pump were attached to our engine and an elevated tank with a capacity of forty thousand gallons were erected in the yard, a supply of water could be obtained from driven wells or from the river, sufficient for all our needs, equal or superior in quality to that now furnished by the water company, and at a greatly reduced annual outlay.

Adjoining and east of the prison yard, is a lot of land containing about eight acres, overgrown in summer with shrubs and high weeds, and affording at certain seasons a convenient hiding-place for escaped convicts. The ground is annually burned over, endangering the safety of the prison buildings. Moreover, on general grounds and as a matter of expediency, it is undesirable that prison buildings should be so near to the boundary line of the prison premises.

For these reasons your Directors respectfully recommend that the property in question be purchased, if it can be obtained at a fair price; otherwise, that it be condemned to public uses and added to the prison enclosure.

The heating apparatus of the prison, after a thorough trial and every practicable effort to make it serviceable by repairs and alterations, has proved to be inadequate.

It was found impossible, even during the unusually mild winter of 1889–90, to furnish to certain quarters of the prison the necessary degree of heat, while the noise in the pipes, "hammering," as it is called, renders it often very difficult to hear other sounds in the prison. The grave disadvantages of this dilemma need not be pointed out. The boilers are all that could be desired, but the piping is seriously defective and should be thoroughly overhauled and readjusted.

Your Directors beg leave to call attention to the small salaries paid to our prison officers. The frequent changes in the force, in consequence of larger compensation paid elsewhere for similar service, seriously interfere with uniformity of discipline, and leave the prison at times with too considerable a proportion of untried and untrained officers.

Your Directors would suggest that the transportation of convicts to the prison might well be entrusted to county officers and paid for by the counties. An arrangement of this nature would be in the line of convenience and economy, and would be fully justified by the experience of other states.

In April, 1889, a long-term prisoner escaped through the negligence of one of the officers, who is not now connected with the prison.

Since the removal of the prisoners to the new cell-block there has been a marked improvement in health, comfort and conduct. Punishments have diminished in number and duration. The former sullen, dogged, hopeless expression has in large measure disappeared. In a word, everything indicates that the vastly improved conditions of light, heat, ventilation, and space have contributed materially to the physical, mental, and moral well-being of the prisoners.

Our cordial thanks are due to those ladies and gentlemen who, by evening concerts, lectures and entertainments

of various kinds have done much to relieve the monotony of prison life.

Since the period covered by our last report, discipline has been well maintained. The warden, deputy-warden, and the subordinate officers have discharged their duties with zeal and fidelity. In their care of the prisoners they have not suffered a strict enforcement of rules to override humanity, nor have they neglected any reformatory treatment consistent with the necessary limitations of an ungraded prison.

For further details, you are respectfully referred to the accompanying report of the physician and the chaplains, and for the financial statement, including the recital of sums needed to be appropriated for prison purposes, to the report of the warden.

FRANCIS WAYLAND, *President.*
EDWARD J. MURPHY,
NATHAN M. BELDEN,
CYRUS B. NEWTON,
WILLIS S. BRONSON,
RANSOM T. HEWITT,
CHAS. A. ELLIOTT.

WARDEN'S REPORT.

To the Hon. Francis Wayland, *Chairman and the honorable Board of State Prison Directors:*

Gentlemen:

Agreeable to the provisions of section 3,340, chapter CCVII., of General Statutes, I have the honor to report, for your information and consideration, the statistical and financial condition of the prison during the fiscal years of 1889 and 1890, ending June 30th, 1890.

CONDENSED TABLES.

Highest number of convicts in confinement during the two years, - - . - -	361
Lowest number of convicts in confinement during the two years, - - - - -	271
Average number of convicts in confinement during the two years, - - - - -	323

CLOTHING ACCOUNT.

The cost of clothing, bedding, freedom suits, and the making of the same, is fourteen and 85-100 dollars for the two years *per capita*, or two and 3-100 cents per day.

PROVISION ACCOUNT.

The cost of provision, including fuel for cooking, labor, &c., is seventy-seven and 87-100 dollars ($77.87) for the two years for each convict, or ten and 66-100 cents per day.

TOTAL COST.

The total cost of maintaining the prison, including the officers' salaries, *per capita*, for the two fiscal years, is two hundred and sixty-four and 73-100 dollars, or thirty-six and 46-100 cents per day.

EXPENSES.

Expense over income in two years (exclusive of $9,226.76 paid to John C. Mead and John R. Hills for necessary improvements, for which there was no appropriation) was $13,879.94.

RECOMMENDATIONS.

I again recommend an increase in the salaries of the prison officers.

Also, that a power-pump be attached to the engine and an elevated tank of 15,000 gallons capacity be erected in the west yard, to give the prison an independent water supply. It costs over $1,200 per year for water furnished by the Hartford Water Company.

Also, that the two upper stories of the shops be united over the boiler house.

I also recommend that the lot of land lying adjacent to the state property on its eastern boundary, containing about eight acres, be condemned and bought for prison use. Most of it is swale land, of little value, covered with a dense jungle of undergrowth and weeds, a constant source of danger from fire and to facilitating escapes from the prison.

APPROPRIATIONS.

For expense above income for 1891 and 1892, $7,000 per year,	$14,000
For deficiency, present fiscal year ending September 30, 1891,	5,000
For proposed water-works,	6,000
For proposed improvement in shops and elevators,	3,700
For proposed purchase of eight acres of land on east side (Hubbard lot),	1,600
For changing or improving the steam-heating apparatus,	2,500
	$32,800

The above is a careful estimate for the current expenses for the next two fiscal years ending September 30, 1893, for deficiency incurred by putting motive power into the new shops, the extension of the fiscal year three months, for cost of necessary improvements and the proposed purchase of land.

REMARKS.

In July, 1889, Overseer George E. Baisden was promoted to be deputy warden, vice Bently S. Powers, removed. Deputy Baisden has proved a most valuable and efficient executive officer, and by an intelligent, courteous, and yet firm, enforcement of good, wholesome prison discipline, has shown that your confidence in his ability was not misplaced.

Mrs. V. A. Crittenden was appointed matron, in May, 1889, vice Mrs. A. L. Carpenter, removed, and many changes have been made among the subordinate officers, whereby the moral tone of the official staff has been improved and its efficiency greatly increased.

In enforcing discipline and defending my life, the unpleasant duty was forced on me to shoot a convict, but thanks to my previous training, I inflicted only a flesh wound, which proved sufficient to subdue him.

To you, gentlemen of the Board of Directors, who are thoroughly acquainted with the true inwardness of prison life at Wethersfield, and have seen the great improvements made in this institution, architectural, disciplinary, and morally, during the last five years, I would state that if my administration during that time has met with your approval, I am content.

Very respectfully,

S. E. CHAMBERLAIN, *Warden.*

FINANCIAL TABLES.

1890.

INCOME.

SHOE SHOPS.

Received for work done, 1888–89, . .	$33,022.73	
" " " 1889–90, . .	33,856.25	
Stock on hand June 30, 1890, . . .	62.30	$66,941.28
Stock on hand June 30, 1888, . . .	77.20	
Discount to contractors while moving, . .	435.00	512.20
		$66,429.08

PROFIT AND LOSS.

Received from visitors, 1888–89, . . .	$889.85	
" " 1889–90, . . .	1,016.85	$1,906.70
Received of S. E. Chamberlain amount allowed by Building Commissioners for extra services, , .		500.00
		$2,406.70

BOARD ACCOUNT.

Received for board of U. S. prisoners, 1888–89,	$643.37	
" " " " 1889–90,	411.28	$1,054.65

LABOR ACCOUNT.

Received for labor, J. C. Mead, 1889, . .	$466.76	
" " J. R. Hills, 1890, . .	100.00	$566.76

MOTIVE POWER.

Received for power furnished shops, ...		$75.00

SUNDRY SALES.

Received for pork, ...	$1,039.70	
" old iron, stone and brick, .	821.29	$1,860.99
Total, ...		$72,393.18

EXPENDITURES.

EXPENSE ACCOUNT.

Stock on hand June 30, 1888, . . .	$9,393.79	
Board of officers and incidental expenses, .	14,922.00	
Paid J. C. Mead, building and repairs, .	6,293.63	$30,609.43
Sundry credits to this account, . . .	$1,200.67	
Stock on hand June 30, 1889, . . .	16,762.47	17,963.14
		$12,646.28
Stock on hand June 30, 1889, . . .	$16,762.47	
Board of officers, incidental expenses, . .	9,600.24	
Paid J. R. Hills, building and repairs, .	2,933.04	$29,295.75
Sundry credits to this account, . . .	$1,231.12	
Stock on hand June 30, 1890, . . .	15,386.48	16,617.60
		$12,678.15
Receipts from old brick and stone, credited this acct.,		821.29
		$13,499.44
Amount of expense account for two years, . . .		$26,145.72

PROVISIONS.

Stock on hand June 30, 1888, . . .	$2,345.42	
Amount purchased during year, . . .	10,849.35	$13,194.77
Sundry credits to this account, . . .	111.28	
Stock on hand June 30, 1889, . . .	2,203.36	2,314.64
		$10,880.13
Receipts from pork credited the account, . . .		491.30
		$11,371.43
Stock on hand June 30, 1889, . . .	$2,203.36	
Amount purchased during year, . . .	9,795.81	$11,999.17
Sundry credits to this account, . . .	$626,70	
Stock on hand June 30, 1890, . . .	327.83	954.53
		$11,044.64
Receipts from pork credited this account, . . .		548.40
		$11,593.04
Amount of provision account for two years, . .		$22,964.47

CLOTHING AND BEDDING.

Stock on hand June 30, 1888, . . .	$2,201.16	
Amount purchased for fiscal year, . .	3,132.35	$5,333.51
Sundry credits to this account, . . .	361.88	
Stock on hand June 30, 1889, . . .	2,680.04	3,041.92
		$2,291.59
Stock on hand June 30, 1889, . . .	$2,680.04	
Amount purchased for fiscal year, . .	2,309.08	4,989.12
Sundry credits to this account, . . .	90.12	
Stock on hand June 30, 1890, . . .	$2,394.42	2,484.54
		$2,504.58
Amount of clothing and bedding account for two years,		$4,796.17

LIGHTS, FUEL AND WATER.

Stock on hand June 30, 1888, . . .	$379.62	
Amount purchased for fiscal year, . .	8,296.72	$8,676.34
Sundry credits to this account, . . .	$343.97	
Stock on hand June 30, 1889, . . .	3,707.20	4,051.17
		$4,625.17
Stock on hand June 30, 1889, . . .	$3,707.20	
Amount purchased for fiscal year, . .	2,697.44	6,404.64
Sundry credits to this account, . . .	$375.65	
Stock on hand June 30, 1890, . . .	816.65	1,192.30
		$5,212.34
Amount light, fuel and water account for two years,		$9,837.51

SALARY ACCOUNT.

Paid salaries of officers for year ending June 30, 1889, ...	$15,115.11	
For year ending June 30, 1890, . . .	15,053.62	$30,168.73

HOSPITAL ACCOUNT.

Stock on hand June 30, 1888, . . .	$150.00	
Amount purchased for fiscal year, . . .	547.41	$697.41
Stock on hand June 30, 1889, . . .		150.00
		$547.41
Stock on hand June 30, 1889, . . .	$150.00	
Amount purchased for fiscal year, . .	503.91	653.91
Stock on hand June 30, 1890, . . .		200.00
		$453.91
Amount hospital account for two years, . . .		$1,001.32

TRANSPORTATION OF CONVICTS.

Paid for transporting convicts from the several jails for the year ending June 30, 1889,	$311.21
For the year ending June 30, 1890,	274.75
Amount for two years,	$585.96

RECAPITULATION.

INCOME.

Shoe Shops,	$66,429.08
Profit and Loss,	2,406.70
Board Account,	1,054.65
Labor Account,	566.76
Motive Power,	75.00
Sundry Sales,	1,860.99
Expenses above Income,	23,106.70
	$95,499.88

EXPENSE.

Expense Account,	$26,145.72
Provisions,	22,964.47
Clothing and Bedding,	4,796.17
Lights, Fuel and Water,	9,837.51
Salary Account,	30,168.73
Hospital Account,	1,001.32
Transportation of Convicts,	585.96
	$95,499.88

GENERAL SUMMARY.

Paid for benefit of prison library, by resolution of General Assembly,		$297.75
Paid for advertising petitions for pardon, by resolution of General Assembly,		16.65
Cash on hand, June 30th, 1890,		5,109.91
Amount of property on hand, as per inventory, June 30th, 1890,	$19,187.68	
Amount of property on hand, as per inventory, June 30th, 1888,	14,547.19	— 4,640.49
Expenses above income for two fiscal years ending June 30th, 1890,		23,106.70
		$33,171.50

Received from State Treasurer to defray current expenses,		$18,524.45
Cash on hand, June 30th, 1888,		14,529.12
Book account, June 30th, 1888,	$205.93	
Book account, June 30th, 1890,	88.00	— 117.93
		$33,171.50

WARDEN'S OFFICE,
CONNECTICUT STATE PRISON,
WETHERSFIELD, August 13, 1890.

This will certify that we have examined the accounts of Samuel E. Chamberlain, Warden of the Connecticut State Prison, for the fiscal year ending June 30th, 1889, compared the vouchers therewith, and find the same correct.

That we have also examined the accounts for the fiscal year ending June 30th, 1890, compared the vouchers therewith, and find the same correct, showing a balance in the hands of the Warden amounting to the sum of five thousand one hundred and nine dollars and ninety-one cents ($5,109.91).

FRANK L. RODGERS, } *Auditors of*
W. CECIL DURAND, } *Public Accounts.*

WARDEN'S OFFICE,
CONNECTICUT STATE PRISON,
WETHERSFIELD, June 30th, 1889.

We hereby certify that the value of the State Prison property, June 30th, 1889, as appraised by us, is as follows, viz.:

Real Estate, comprising State Prison buildings, Warden's house, with the Wells house, Deputy Warden's house, stables, &c., and about twenty-four acres of land, -	$325,000.00
Personal property, consisting of furniture, clothing, bedding, provisions, hospital stores, live stock, vehicles, tools, fuel, &c., &c., - - - - - - - -	25,585.22

JOSIAH G. ADAMS, } *Appraisers*
SIMEON HALE, } *under oath.*

STATE OF CONNECTICUT, }
COUNTY OF HARTFORD, } ss.

WETHERSFIELD, June 30th, 1889.

Personally appeared Josiah G. Adams, and Simeon Hale, and made oath that they have justly appraised the

property of the Connecticut State Prison in Wethersfield, according to the true value thereof, and to the best of their ability, before me.

GERRIT H. CHAFFEE,
Notary Public.

WARDEN'S OFFICE,
CONNECTICUT STATE PRISON,
WETHERSFIELD, June 30th, 1890.

We hereby certify that the value of the State Prison property, June 30th, 1890, as appraised by us, is as follows, viz. :

Real estate, comprising State Prison buildings, Warden's house, with the Wells house, Deputy Warden's house, stables, &c., and about twenty-four acres of land,	$345,000.00
Personal property, consisting of furniture, clothing, bedding, provisions, hospital stores, live stock, vehicles, tools, fuel, &c.,	19,187.68
Steam plant,	2,700.00

JOSIAH G. ADAMS, } *Appraisers*
SIMEON HALE, } *under oath.*

STATE OF CONNECTICUT, }
COUNTY OF HARTFORD, } ss.

WETHERSFIELD, June 30th, 1890.

Personally appeared Josiah G. Adams and Simeon Hale, and made oath that they have justly appraised the property of the Connecticut State Prison, situated in Wethersfield, according to the true value thereof, and to the best of their ability, before me.

GERRIT H. CHAFFEE,
Notary Public.

STATISTICAL TABLES.

1889 and 1890.

NUMBER OF PRISONERS IN CONFINEMENT JULY 1, 1888, SINCE RECEIVED, DEATHS, DISCHARGES, &c.

Whole number in confinement July 1, 1888,	301	
Since received,	318	
		619
Discharged by expiration of sentence,	258	
" " pardon,	7	
" " order of secretary of navy,	1	
Transferred to Hospital for Insane,	10	
Escaped,	1	
Pardoned by the President,	2	
Died,	22	
		301
Leaving in confinement, July 1, 1890,		318
Of this number there are for first offense,	286	
" " " second offense,	25	
" " " third offense,	4	
" " " fourth offense,	2	
" " " seventh offense,	1	
		318

NATIVITY.

Connecticut,	114	Ohio,	2
Maine,	3	Illinois,	2
Maryland,	4	Missouri,	2
Massachusetts,	39	Canada,	4
New Jersey,	5	England,	7
New York,	44	Germany,	15
Pennsylvania,	7	Ireland,	25
Kansas,	1	Italy,	7
Rhode Island,	9	St. Helena,	1
Virginia,	3	Sweden,	3
District of Columbia,	3	Spain,	1
Vermont,	3	Portugal,	1
Michigan,	2	Scotland,	5
South Carolina,	2	Hungary,	1
Indiana,	1	Peru,	1
Iowa,	1		318

NATIVITY.

Americans,	247	
Foreigners,	71	
		318

COLOR AND SEX.

White Males,	284	
White Females,	5	
Colored Males,	29	
		318

AGES WHEN COMMITTED.

Under 20 years of age,	21
From 20 to 30 years of age,	162
From 30 to 40 years of age,	80
From 40 to 50 years of age,	31
Over 50 years of age,	24

CRIME.

Assault with intent to kill,	8
Assault with intent to kill and burglary,	2
Assault with intent to murder,	4
Assault with intent to rape,	4
Assault with actual violence,	1
Assault and battery,	2
Attempt to rape,	3
Attempt to rob,	4
Attempt to commit burglary with intent to commit rape,	1
Abduction,	1
Assault with intent to kill infant child,	1
Abandoning infant child,	1
Assault on minor female child,	1
Attempt to commit murder,	1
Assault and carnal abuse of child,	1
Adultery,	2
Attempt to break jail,	1
Arson,	7
Burglary,	60
Bigamy,	1
Burglary with violence,	2
Breaking jail, burglary, and armed with deadly weapon, and theft,	1
Breaking into a dwelling,	1
Breaking into with intent of theft,	1
Breaking and entering in day-time with intent to steal, and theft,	1

Burning buildings,	3
Bestiality,	1
Embezzlement,	2
Forgery,	4
Guilty of charges preferred,	2
Having burglary tools,	1
Horse stealing,	21
Horse stealing and burglary,	5
Highway robbery,	5
Injuring property,	1
Murder,	1
Murder, second degree,	32
Murder commuted,	1
Manslaughter,	16
Making false entries,	2
Larceny,	1
Obtaining money under false pretenses,	1
Passing counterfeit coin,	1
Poisoning with intent to murder,	1
Rape,	14
Robbery,	11
Statutory burglary,	24
Theft,	20
Theft from person,	19
Theft and breaking jail,	1
Tramping,	15
	318

SENTENCES.

For 3 months,	6	For 5 years,	34
4 months,	3	5 years, $1.00 fine,	3
6 months,	5	6 years,	8
1 year,	38	6 years, 6 months,	1
1 year, 3 months,	2	6 years, $1.00 fine,	1
1 year, 6 months,	13	7 years,	9
2 years,	38	7 years, $1.00 fine,	1
2 years, 6 months,	6	8 years,	3
2 years, $1.00 fine,	3	8 years, 6 months, $500 fine,	1
3 years,	26	9 years,	1
3 years, $1.00 fine,	1	10 years,	15
3 years, $500 fine,	1	10 years, $1.00 fine,	1
4 years,	30	12 years,	4
4 years, 6 months,	1	13 years,	1
4 years, $1.00 fine,	1		

For 14 years,	1		For 25 years,	2	
15 years,	8		35 years,	2	
16 years,	1		Life,	40	
18 years,	2				318
20 years,,	3				

EMPLOYMENT OF PRISONERS, JUNE 30, 1890.

FOR CONTRACTORS.

Marcy Bros. & Co., boots and shoes,	155	
Hunt & Holbrook, boots and shoes,	56	
		211

FOR PRISON ACCOUNT.

Kitchen and bakery,	19	
Carpenter,	1	
Bookbinder, shoemaker,	2	
Hospital nurse and assistants,	2	
Hall waiters,	11	
Shop runners,	9	
Laborers,	34	
Barber,	1	
Laundry,	3	
Outside,	3	
Females in sewing room,	5	
		90

UNEMPLOYED.

Hospital patients,	13	
In cells,	4	
		17
		318

THE THREE HUNDRED AND EIGHTEEN PRISONERS RECEIVED FOR THE TWO FISCAL YEARS ENDING JUNE 30, 1890, WERE FROM

Fairfield County,	105	New London County,	21
Hartford County,	52	Tolland County,	9
Litchfield County,	36	Windham County,	25
Middlesex County,	18	U. S. Navy,	2
New Haven County,	50		
			318

PRISONERS PARDONED BY THE HON. BOARD OF PARDONS FOR THE TWO FISCAL YEARS ENDING JUNE 30, 1890.

DATE.	NAME.	CRIME.	NATIVITY.
1888.			
July 2,	Edward Goebel,	Robbery with personal abuse,	Conn.
"	Oliver Budd,	Robbing with violence,	N. Y.
"	Arthur Bennett,	Burglary and theft,	Conn.
1889.			
July 4,	Chas. W. Maynard,	Rape,	Conn.
"	Peter Smith,	Burglary & att'pt to brk. jail,	Conn.
"	Thomas Kennedy,	Theft,	Ireland.
1890.			
June 10,	James Fuller,	Rape,	England.

THE SENTENCES OF PRISONERS NOW IN PRISON, EXPIRE AS FOLLOWS:

In 1890,	66	In 1900,	3
1891,	83	1901,	7
1892,	42	1902,	1
1893,	32	1903,	1
1894,	18	1904,	1
1895,	6	1907,	2
1896,	5	1914,	2
1897,	1	Life,	40
1898,	6		
1899,	1		318

PRISONERS UNDER SENTENCE FOR LIFE.

NAMES.	AGES.	WHERE CONVICTED.	WHEN CONVICTED.	NATIVITY.	CRIME.
Stephen Abbott,	52	New Haven,	Jan. 15, 1869,	Connecticut,	Murder.
Frederick Hall,	32	Litchfield,	July 19, 1871,	Mass.,	" com.
John Warren,	21	Tolland,	Dec. 14, 1859	Connecticut,	" 2d deg.
Charles E Gilbert,	25	Hartford,	May 4, 1865,	"	" "
Joel W. Perkins,	54	Litchfield,	Apr. 28, 1871,	"	" "
Oscar Graves,	18	Hartford,	Sept. 23 1873,	"	" "
Dwight F. Steere,	28	Norwich	Apr. 24, 1876,	Mass.,	" "
Robert L. Espy,	55	Hartford,	Sept. 6, 1877,	Ireland,	" "
George Allen,	33	Bridgeport	Sept. 7, 1877,	Connecticut,	" "
Patrick Lynch,	38	New Haven	Oct. 26, 1877,	Ireland,	" "
Lorena Alexander,	44	Bridgeport,	Nov. 8, 1878,	New York,	" "
Kate M. Cobb,	31	Norwich,	Jan. 17, 1879	Connecticut,	" "
Frank Bassett,	24	Bridgeport,	Mar. 1, 1879,	"	" "
John H. Davis,	27	Hartford,	Apr. 3 1879,	Mass.,	" "
Wesley W. Bishop,	33	Norwich,	May 30, 1879,	Connecticut,	" "
Jefferson Ellis,	34	Haddam,	Dec. 12, 1879,	New York,	" "
William Buckholtz,	25	Bridgeport,	June 1, 1880,	Germany,	" "
George French,	32	New Haven,	Oct. 13, 1881,	Connecticut,	" "
Frank V. Conant,	34	N. London,	Oct. 15, 1884.	Mass.,	" "
William Johnson,	30	New Haven,	Jan. 22, 1885	So. Carolina,	" "
Andrew Squires,	40	Brooklyn,	Apr. 23, 1885,	Connecticut,	" "
John P. Kennedy,	28	N. London,	Apr. 27, 1885,	Kansas,	" "
Frederick Young,	17	Brooklyn,	Apr. 15, 1886	Connecticut,	" "
Richard Coyle,	58	Norwich	May 4, 1886,	Ireland,	" "
Wales L. Doolittle,	39	New Haven,	Oct. 19, 1886,	Connecticut,	" "
Henry S. Hotchkiss	40	Hartford,	Mar. 3, 1887,	Connecticut,	" "
Henry B. Chamberlain,	22	New Haven,	July 18, 1887,	Connecticut,	" "
James F. Taylor,	20	New Haven,	July 18 1887,	New York,	" "
Robert Drakeley,	21	Litchfield,	Sept. 22, 1887,	Maryland,	" "
Martin Feeney,	37	Waterbury,	Nov. 1, 1887,	Vermont,	" "
Jacob Brown,	29	Bridgeport,	Nov. 17, 1887,	Connecticut,	" "
John Hawley,	30	Danbury,	Oct. 21, 1868,	Connecticut,	Rape.
George Hudson,	31	New Haven	Sept. 28, 1869,	St. Helena,	"
Edgar Freeman,	24	New Haven,	June 17, 1879,	Connecticut,	"
Edward Brown,	46	New Haven,	Apr. 13, 1886,	Ireland,	Bestiality.
George A. Bradley,	24	Hartford,	June 5, 1889	Connecticut,	Murder, 2d deg.
George Cooper,	59	Middlet'wn,	Apr. 3, 1889,	England,	" "
Martha C. Johnson,	58	Tolland,	Dec. 22, 1888,	Connecticut,	" "
William D. Johnson,	26	Litchfield,	May 1, 1889,	Connecticut,	Rape.
Rudolf Stoffle,	40	Bridgeport,	Oct. 18, 1889,	Germany,	Murder, 2d deg.

RELATING TO CONTRACTS.

NAME OF CONTRACTOR.	CLASS OF MANUFACTURES.	TIME.	NO. OF MEN.	RATE PER DAY PAID.	AMOUNT EARNED FOR LABOR.
Marcy Bros. & Co.,	Boots and Shoes,	24 months,	156	$0.50	$48,126.00
" " "	" " "	24 months,	8	.25	1,750.73
Hunt & Holbrook,	" " "	24 months,	56	.50	17,002 25

RATIONS.

Sunday.	Breakfast,	Baked beans and pork, bread and coffee.
	Dinner,	Beef and Vegetable soup and bread.
	Supper,	Bread.
Monday.	Breakfast,	Rice and molasses, bread and coffee.
	Dinner,	Corned beef, vegetables and bread.
	Supper,	Bread and tea.
Tuesday.	Breakfast,	Corned beef hash, bread and coffee.
	Dinner,	Stewed beans and pork and bread.
	Supper,	Bread and tea.
Wednesday.	Breakfast,	Codfish hash, bread and coffee.
	Dinner,	Fresh beef stew and bread.
	Supper,	Bread and molasses, and tea.
Thursday.	Breakfast,	Corned beef hash, bread and coffee.
	Dinner,	Corned beef, vegetables and bread.
	Supper,	Bread and tea.
Friday.	Breakfast,	Hominy and molasses, bread and coffee.
	Dinner,	Codfish hash, and bread.
	Supper,	Bread and tea.
Saturday.	Breakfast,	Corned beef hash, bread and coffee.
	Dinner,	Stewed beans and pork, and bread.
	Supper,	Bread and molasses, and tea.

CHAPLAIN'S REPORT.

To the Board of Directors of the Connecticut State Prison:

GENTLEMEN:

The period of two years, covered by this report, has been an important one in the history of this institution. It has witnessed the completion of the work of alteration and enlargement of the prison buildings. The changes thus effected have contributed largely to the physical comfort of the prisoners, and increased the facilities for their mental and moral improvement.

The new chapel, which was dedicated with appropriate religious services, on Sunday, February 17, 1889, is admirably adapted to its intended use, being not only a commodious, comfortable and attractive place of Sabbath worship, but also a suitable place for evening entertainments, such as lectures, concerts and dramatic readings, which have occasionally been given for the benefit of the prisoners. These entertainments have been provided by enlisting the co-operation of public speakers, musicians and other persons, and obtaining their generous consent to give their services at the prison without compensation. The value of such wholesome entertainments in their good effects directly upon the mental health, and indirectly upon the moral condition of the prisoners, is great and manifest, and the more frequent use of the chapel for similar purposes in the future, is recommended.

Sabbath services and a Sunday-school have been maintained, as in years past. It is a gratification to be able to state that provision is now made for the regular attendance of the female prisoners at the chapel services, and for that of the officers' families and any visitors who may choose to be present. For several years past "Gospel

Hymns" has been the sole hymn-book in use at the Sunday services in the prison. The introduction of some other hymnal containing a more varied collection of good hymns, not to displace the Gospel Hymns, but to be used in connection with them, would be a welcome and useful addition to the present equipment for the services of worship.

An evening school for the benefit of illiterate prisoners was opened May 16, 1889, with an attendance of seventeen pupils the first evening. It is held on Tuesday and Friday evening of each week, with sessions of one hour. The average number of prisoners in attendance is about a dozen. The pupils, who are taught by one of their own number, have thus far received instruction only in reading and writing. If the ulterior purpose in the maintenance of the school is to aid in fitting prisoners to discharge the duties of citizenship when released, would it not be well to widen the range of studies so as to include in it instruction in the fundamental principles of arithmetic and a general knowledge of the geography and government of our country, and encourage the attendance of every well-behaved prisoner of sound mind, not over forty-five years of age, who can not read and write English?

Having held the position of librarian for a little more than a year past, I have had opportunity to acquaint myself with the books in the prison library, and with the reading habits and tastes of the prisoners. The nearly fifteen hundred volumes in the library are freely drawn upon at each weekly distribution. Some of the books are so old as to be practically valueless, and could be withdrawn from the library without detriment to its usefulness. There is need that it be replenished by the purchase of new books of recent publication, especially in the departments of history, biography and travel, with a few popular treatises on natural science, and a choice selection from the works of our best writers of fiction.

One irksome feature of life in prison is its monotony. Anything which relieves this monotony, without conflicting with the regularity of prison life or the efficiency of

prison discipline is a boon and a blessing to the prisoner. The truth of this statement was illustrated during the latter months of 1889, when the prisoners at Wethersfield were accorded the privilege of employing their evenings in making such articles of utility or adornment as they could construct in their cells by the aid of a few simple tools. The articles so made by any prisoner were put on sale and the proceeds placed to his credit. During the time the prisoners were thus busied with voluntary labor there was a perceptible improvement in their physical health, cheerfulness and contentment; and the hope is entertained that at no distant day some plan may be adopted by which varied exercise, both of mind and muscle, other than that which the routine work of the shops now affords, may be continuously given to the prisoners at Wethersfield. The relation of such exercise to the moral and religious improvement of the inmates of our State Prison, no less than its tendency to prevent insanity and certain kinds of disease, cases of which are frequent within prison walls, is obvious.

It will be expected that something be said in this report in regard to the results of the reformatory work done in our State Prison. Are these results commensurate with the effort put forth? What proportion of the prisoners are really reformed while in prison? Viewed simply as matter of economics, does it *pay* to expend in this work the sum annually appropriated for it? In replying to such questions there is need of caution in statement. In many cases those those who are discharged from our State Prison are soon lost sight of by those who had the oversight of them during their imprisonment, and their subsequent history is unknown. Hence no reliable statistics respecting reformatory prison work can be presented. Nor would such statistics, if obtained, tell the whole story. Obviously it is not wise to draw conclusions from assumptions. But this at least can with entire truthfulness be said. The number of prisoners discharged from this institution who are *known* to have subsequently led a correct life is greater by far than the number of

those who are *known* to have lapsed; and this, notwithstanding the fact that instances of lapse are more likely to become known than are instances of a subsequent perseverance in well-doing. Or we may take another view of the subject. Considering the estimated annual expense incurred by the state on account of crime within its bounds, the amount *saved* by the state through the transfer of reformed prisoners from the class who are a burden and a menace to society, and their return to the ranks of industrious and law-abiding citizens, vastly exceeds the amount annually expended in the work of their reformation in prison. And when we take into account the worth of the moral manhood thus restored to those who had lost it, the peace, purity, and happiness brought once more into their homes, and above all else the change in destiny of those who, we believe, are not only reformed but transformed in prison, we see there is no reason for abatement in this work, but abundant reason for more zeal, faith, and wisdom in carrying it forward.

Acknowledgments are due, and are hereby gratefully rendered to all who in any way have aided the chaplain in his work; especially to those clergymen and others who have addressed the prisoners at the chapel services, or furnished occasional evening entertainment for them; to the gentlemen who have continued to give their time and services as teachers in our Sunday-school; to the American Tract Society for a donation of its publications for the prisoners' use; and to many individuals for gifts of papers and pamphlets for a like purpose.

Respectfully submitted,

E. L. JAGGAR, *Chaplain.*

Conn. State Prison,
WETHERSFIELD, June 30, 1890.

To the Directors of the Connecticut State Prison :

GENTLEMEN :

Shortly after the last report was submitted to you, I commenced my work among the Catholic inmates of the prison. Since that time I have endeavored to give the inmates such religious instruction and spiritual assistance as was considered appropriate to their circumstances and requirements.

Knowing that the influence of religion is conducive to the happiness of the individual, and that a knowledge and practice of christianity are necessary for the welfare of any community, I have made it my aim to give the inmates those instructions which were calculated to make them better Christians, and consequently better men, and more worthy members of society.

These instructions are given in the prison chapel on the second Sunday of every month, at which time and place the Holy Mass is celebrated. About Christmas and Easter of each year the men enjoy the privilege of receiving the sacraments of Penance and Holy Eucharist. In case of sickness, they are also by the kindness of the Warden, allowed the advantages and consolations of their religion.

As in the past, the members of the Young Men's Catholic Association have given us their co-operation, and materially assisted us in carrying on this Christian work. Every Sunday during the time set apart for Sunday-school, these young men teach Christian doctrines, and assist the inmates to learn many important truths of religion, for it is a deplorable fact that most of the men have received little or no Christian training, and this, I venture to say, in many cases accounts for their presence in the institution.

Every week a number of copies of a Catholic periodical is distributed among the men, which, together with the books of the Catholic library furnish them with interesting and at the same time instructive reading.

It has been a pleasure during the past two years to note the very good attendance at Sunday-school, and at the religious exercises; and I have reason to say that the influences thus brought to bear on the men have made them better, and have served to prepare them for more honorable lives in the future.

Since the last report the beautiful new prison chapel has been completed, and we take occasion here to congratulate you and Warden Chamberlain for the great zeal thus manifested for the spiritual welfare of the inmates.

I am indebted to the warden and his officers for various acts of kindness during my various visits to the prison, for which courtesies I wish to return sincere thanks. Trusting that Almighty God will bless our work and guide our efforts, I am respectfully yours,

J. T. LYNCH, *Catholic Chaplain.*

PHYSICIAN'S REPORT.

To the Hon. Board of Directors of the Connecticut State Prison:

GENTLEMEN:

In obedience to your requirements, the following report of matters relating to the health of the prisoners for the period of two years, ending June 30 of the present year, is respectfully submitted.

Diarrhœal troubles, although to some extent pretty constantly present, have given less annoyance than during the two preceding years.

The prevalence of malarial fever has been less marked, although cases of it have been continually recurring; as a rule they have been, as compared with former years, considerably modified in their type.

The number of men from the shops, on the "sick list" has been about the same. The complaints, of course, have been quite varied in their nature, many of them of little account; largely they have been of disordered digestion, neuralgic affections; rheumatism and skin diseases have been notably common.

The epidemic influenza of last January was not unusually severe as compared with other localities. About half the men were sufferers from it, and in only two or three instances were there any permanently serious results.

In May of the present year there was an unusual prevalence of throat and bronchial affections with some cases of broncho-pneumonia, resulting in death in two instances. It should, however, be said that previous tubercular disease was believed to be present in both.

The prevalence of pulmonary consumption in the prison, especially in the last year, would seem to merit some

consideration. In the two years there have been eleven (11) deaths from this cause. At the present time there are in the hospital eleven patients with this disease. In the "hall" there are about the same number with symptoms of tuberculous disease, more or less marked. During the last year eight have been discharged, who had been more or less under treatment for the same disease.

The difficulties attendant upon a successful treatment of consumption are well known. The best treatment is prevention. This failing, there are few, if indeed there is a single disease, in which the hygienic surroundings, as compared with remedies strictly medical, are of greater importance.

To be confined within the walls of a hospital, month after month, with no means, of any account, of mental or physical exercise, in its prolonged monotony is necessarily depressing. Hence as long as the patient is able to perform some labor in the shops, by reason of the bodily exercise, as well as mental diversion he gets, he is treated as a rule with better success than in the hospital.

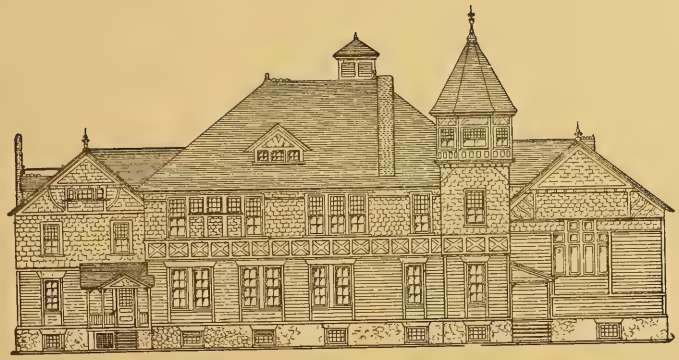
If (as I am told is contemplated) some arrangement is to be made by which invalids can have some occupation suited to their condition, a long felt want will be remedied, and especially upon patients in the hospital who are able to take exercise would a great benefit be conferred, if allowed to participate in it.

Repeated instances within my own observation have occurred where men with well marked symptoms of incipient consumption have been given work "outside," or been transferred to duties in the hall or kitchen, with the best results.

In the period covered by this report there have been twenty-two (22) deaths. Suicide, scrofulous disease of the knee-joint, typhoid fever, Bright's disease, chills, are each credited with one—five in all; diarrhœal diseases, three; pneumonia, three; consumption eleven.

A. S. WARNER.

WETHERSFIELD, June 30, 1890.



MAIN BUILDING, STORRS SCHOOL, ERECTED 1890.

DORMITORY, ERECTED 1890.

ANNUAL REPORT

OF THE

TRUSTEES

OF THE

STORRS AGRICULTURAL SCHOOL

AT

MANSFIELD, CONN.

P. O., STORRS, CONN.)

1890.

PRINTED BY ORDER OF THE GENERAL ASSEMBLY.

HARTFORD, CONN.:
PRESS OF THE CASE, LOCKWOOD & BRAINARD COMPANY.
1891.

TRUSTEES.

		Term Expires
His Excellency MORGAN G. BULKELEY,	*President,*	
E. H. HYDE,	Stafford, *Vice-President.*	
	Appointed by the Board of Agriculture.	
T. S. GOLD,	W. Cornwall, *Secretary,*	1893
HENRY C. MILES,	Milford, *Treasurer,*	1891
WM. E. SIMONDS,	Canton, *Auditors,*	1893
WM. B. SPRAGUE,	Andover, *Auditors,*	1891
J. M. HUBBARD,	Middletown,	1893
J. H. HALE,	South Glastonbury,	1891
Prof. S. W. JOHNSON,	New Haven, *Ex officio, Director of the Connecticut Experiment Station.*	

OFFICERS OF THE SCHOOL.

B. F. KOONS, *Principal.*

J. R. HUTTON, B.S.A., *Professor of Chemistry and Physics.*

L. P. CHAMBERLAIN, *Professor of Agriculture and Farm Superintendent.*

C. S. PHELPS, B.S., *Associate Professor of Agriculture.*

Miss JOSEPHINE NETTLETON, *Instructor in Mathematics, English, and Physical Geography.*

Mrs. C. E. HILLIARD, *Matron.*

State of Connecticut.

REPORT.

To His Excellency, the Governor of Connecticut:

As Secretary of the Board I have the honor, in behalf of the Trustees, to present to you the Annual Report of the Storrs' Agricultural School, for the year 1890.

It contains an official list, report of the principal, embracing calendar, catalogue, prospectus, course of instruction, list of text-books, commencement exercises, alumni association, winter course of lectures, reading-room, library, inventory, labor of students, school expenses, boarding department, inventory of live stock and tools, farm and garden products, and permanent improvements.

The work of each department is more fully set forth by those in special charge. The report of the treasurer gives the financial condition of the institution.

The principal feature in the year's history of the school is the erection of the new school buildings.

The General Assembly of 1889 appropriated the sum of fifty thousand dollars for the erection of two buildings, in accordance with a general plan adopted. A school building for lecture-rooms, library, laboratories, dining-hall, with rooms for matron and her assistants, and a dormitory with thirty rooms for students, and rooms for the principal and family. Each room is for a single student, and has a closet, and is neatly furnished with good, solid oak furniture, and a carpet. It was expected that this building would be ready for occupancy at the opening of the fall term, but circumstances beyond our control, and for which no blame is attached to the contractor, Watson H. Bliss, prevented its use

till about the 1st of December. The main building is now nearly completed, but will not be occupied till spring.

The laboratories and lecture-rooms are planned to accommodate fifty students in the institution, and another dormitory will be needed for them. In providing for this, additional land was required, which was given by Mr. Augustus Storrs — a field of about two acres, his fruit and vegetable garden — bringing to a severe test the generosity of the original founders of the school. This will give room enough to complete the row of buildings according to the present design.

Your building committee expect to complete the two buildings within the appropriation, but an additional sum will be required to furnish them and provide a water supply.

The uncertainty of always having an abundance of water from the present source, induced the trustees to contract for a bored well, 6 inches in diameter, and to supply 15 gallons per minute. A depth of 350 feet has been reached, with only an insufficient supply of water. The work of drilling the solid rock is still in progress, in hopes, by both parties to the contract, of soon striking an abundant supply of water.

At the opening of the fall term our accommodations were crowded, till we gained relief by the occupancy of the new building. We have reason to expect at the opening of the next year, our present enlarged capacity, still retaining the old school building, will be fully occupied.

The growth of the school as its capacity increases is very encouraging to the Trustees. Its plan is new: that of taking young men right from the common schools of the State, and giving them an education for the farm, practical, in the garden and field, while the true methods of scientific research and so much knowledge of the sciences that pertain to agriculture as can be given in a three-years course, are taught in the class rooms and laboratories.

The Experiment Station, with its forage garden, testing of fertilizers, and feeding experiments, furnishes object-lessons for daily study. Strange, but true, a lamentable ignorance exists of the grasses, plants that form the basis of all

successful agriculture — ignorance and confusion not only in regard to their names, but character, qualities, uses, and seed, not only among farmers, who see and work with them every day of their lives, but among seedsmen; while science has left more here of more immediate importance to be developed than in any other branch of the visible world of nature. The forage garden not only shows these things as they are, for study and comparison, but, properly utilized, will sharpen habits of observation, not only as to their individual characters, but also in regard to all objects in the world around us.

These habits of close observation, so necessary to the successful gardener and farmer, are of slow growth, but, once established, become not only a source of pleasure, but open a mine of wealth to the cultivator of the soil, in a pecuniary sense, and in developing the man; for the difference between one man and another is largely in the use of the powers common to humanity.

For the full work of the station reference is made to the Report of the Director, published elsewhere.

In view of the present needs and prospects of intelligent agriculture, we congratulate the citizens of Connecticut upon the successful development of the Storrs' Agricultural School, and confidently rely upon them for that moral and material support necessary to its maintenance and prosperity.

T. S. GOLD, *Secretary.*

December 1, 1890.

To the Board of Trustees:

I have the honor to transmit to you the report of the Storrs' School, for the year ending Nov. 30, 1890.

I am, very respectfully, your obedient servant,

B. F. KOONS.

CALENDAR.

1890.

Winter Term began January 6th. Spring vacation, March 29th to April 6th. Ninth Annual Commencement, June 20th. Fall Term began September 22d. Christmas vacation, December 19th to January 4, 1891.

1891.

Winter Term begins January 5th. Spring vacation, March 28th to April 5th. Spring term begins April 6. Tenth Annual Commencement, June 19th. Fall Term begins September 21st. Christmas vacation, December 19th to January 3d, 1892.

CATALOGUE OF STUDENTS FOR THE YEAR 1890.

Charles George Allyn,	Hebron, Tolland Co.
Herbert Lockaman Andrews,	Deep River, Middlesex Co.
Edmund Sylvanus Backus,	Andover, Tolland Co.
Albion Maurice Baker,	Andover, Tolland Co.
Frederick Otis Barrows,	Mansfield, Tolland Co.
Ernst Hamilton Brandt,	Manchester, Hartford Co.
Merrill Everett Brown,	Coventry, Tolland Co.
Seth Herbert Buell,	Plymouth, Litchfield Co.
Fred. Alroy Bugbee,	Willimantic, Windham Co.
Herbert Porch Cadwell,	Hartford, Hartford Co.
Charles Vibert Chandler,	South Windsor, Hartford Co.
Walter Ernest Cummings,	Spring Hill, Tolland Co.
James Joseph Daley,	Mansfield, Tolland Co.
Aaron William Fenn,	Plymouth, Litchfield Co.
James Sumner Fowler,	Pomfret Center, Windham Co.
Henry Edward French,	Hartford, Hartford Co.
John Carter Frisbie,	Southington, Hartford Co.
George Stuart Gadbois,	Norwich, New London Co.
Charles James Gilmore,	Hartford, Hartford Co.
Wilbur Lionel Goodenough,	Burrville, Litchfield Co.
Alfred Herbert Griswold,	New Britain, Hartford Co.
John Joseph Guilford,	West Winsted, Litchfield Co.
Charles Thomas Guilford,	West Winsted, Litchfield Co.
Arthur Gilbert Hall,	Meriden, New Haven Co.
George Henry Hall, Jr.,	Manchester, Hartford Co.
Warren Wedge Hobby,	Mansfield, Tolland Co.
Walter Holden,	Norwich, New London Co.
Charles Ephraim Hopkins,	Plainfield, Windham Co.
Latham Hull,	No. Stonington, New London Co.
Charles Richard Jewett,	Bridgeport, Fairfield Co.
Herbert Newton Johnson,	Waterbury, New Haven Co.
Carlton Elbert Lane,	Killingworth, Middlesex Co.

Clarence Bronson Lane,	Killingworth, Middlesex Co.
Timothy Albert Mack,	Andover, Tolland Co.
Harry Grant Manchester,	West Winsted, Litchfield Co.
George Henry Merwin,	Westport, Fairfield Co.
George Neth,	Winchester Center, Litchfield Co.
Theodore Olsen,	Avon, Hartford Co.
Martin Hibbard Parker,	South Coventry, Tolland Co.
Charles Backus Pomeroy, Jr.,	Willimantic, Windham Co.
Fred Rosebrooks,	Mansfield, Tolland Co.
Walter Lyman Rosebrooks,	Mansfield, Tolland Co.
Walter Francis Schults,	Hartford, Hartford Co.
Robert Garland Shephard,	South Manchester, Hartford Co.
George Orlando Smith,	South Willington, Tolland Co.
Adolph Carl Sternberg,	West Hartford, Hartford Co.
Charles Herbert Vibert,	Meriden, New Haven Co.
John Hunter Weems,	West Cornwall, Litchfield Co.
Willis LeRoy Wetmore,	Winchester, Litchfield Co.
Herbert Edmund Warner,	East Haven, New Haven Co.
Allen Rice Yale,	Meriden, New Haven Co.

Whole number of students 51. Whole number of students receiving instruction in the school since its organization, 160. Number of graduates, 64.

PROSPECTUS.

LOCATION.

The school derives its name from the donors of the original property, the brothers Augustus and Charles Storrs, of Brooklyn, N. Y., and is situated in the town of Mansfield, Tolland County, one of the most healthful regions of the State, and its railroad, express, and freight station is Eagleville, on the New London Northern road, eight miles north of Willimantic. Telegraph office at Willimantic, telephone connections at the school.

Section 1 of the Act of the General Assembly establishing the school reads as follows: "The Storrs' Agricultural School is hereby established for the education of boys whose parents are citizens of this State, in such branches of scientific knowledge as shall tend to increase their proficiency in the business of Agriculture."

COURSE OF STUDY.

As stated above, the object of the school is to teach Practical and Scientific Agriculture and Horticulture, yet as subservient and necessary to this purpose, various other branches are taught, especial prominence being given to those most necessary for the successful prosecution of Agriculture.

The course of study requires three years of three terms each, each year aggregating 36 weeks. The length of the course has been changed from two to three years, but those who are able to pass a satisfactory examination will be allowed to complete it in two years. For the arrangement of the terms and vacations see the calendar. Students receive instruction both in the class-room and upon the farm.

In the class-room they study those branches of natural science, and only those, which have a directly useful bearing upon New England farming, and the in-door work is made to harmonize with that upon the farm and in the garden. The branches pursued are General and Agricultural Chemistry, Natural Philosophy, Farm Mechanics, Elementary Geometry, Land Surveying, Botany, Zoölogy, which includes, especially, domestic animals and insects

injurious to the crops of the farm and garden; Geology, Human and Animal Physiology, Agriculture, Farm Accounts, Stock Breeding, Milk Production, Arithmetic, and English; taking up first the general principles of these sciences, and afterwards their special application to Practical Agriculture.

On the farm they are taught the practical applications of the principles learned in the class-room to every kind of farm work, so that each boy may become skillful in the management of a farm; and that this may be accomplished, the ordinary chores of the farm, the proper care of all kinds of stock, milking, driving of oxen and horses, and the farm work in general are so arranged, and each student assigned some portion, and changes of work often made, that every boy while a member of the school may have an opportunity to learn how to do all kinds of farm and garden work in the best manner.

FACILITIES FOR INSTRUCTION.

The school possesses a farm of 170 acres, well suited to the purposes of instruction, and apparatus to illustrate the most important facts of chemistry and physics, also is supplied with compound and dissecting microscopes, both mounted and unmounted skeletons of the domestic animals, and a collection of insects injurious to farm and garden crops. The cabinet contains a reasonable representation of the rocks, ores, and minerals of the State, and the library of over 1,500 standard books of reference, scientific, agricultural, and miscellaneous, is at all times accessible to the students, and in addition to these the recent organization of the Hatch Experiment Station, in connection with the school, may be regarded as a very important adjunct, adding much to the educating influences among which the students live while members of the school. The new school and dormitory buildings, now in process of erection, will be ready for occupancy during the year, and will add much to the facilities of the school and comfort of the students. In the new dormitory each pupil has a room to himself, supplied with chairs, table, furnished bed, and carpet.

REQUIREMENTS FOR ADMISSION.

According to the Act of Incorporation, the School is for "The education of boys whose parents are citizens of the State," and under the present regulations, is *not* permitted to receive pupils

from without the State. Applicants must be at least fifteen years of age, and must furnish a certificate of good moral character from a clergyman or a member of the Board of School Visitors of the town where they reside. They must be able to read and write ordinary English correctly and intelligently, and must be familiar with simple arithmetic, and have a fair knowledge of geography and United States history. No pupils will be received into the classes after the beginning of the school year, except those who can sustain a satisfactory examination in all the studies which have been pursued by the class they wish to join.

New classes are not formed at any other time than the beginning of the school year, which is at the opening of the fall term in September; hence, those who contemplate entering the school would do well to make application at least as early as September 1st, and present themselves for the entering examination at the proper time.

DEPORTMENT.

Every pupil on becoming a member of the school thereby pledges his obedience to its rules, and to a diligent performance of his duties. Students are expected at all times to demean themselves in a quiet and gentlemanly manner, and no pupil will be allowed to remain in the school, who, by misconduct or indolence, shows himself unworthy of its benefits. The regulations require all pupils to attend church and Sunday-school once each Sunday, unless previously excused,

The Congregational Church, that being nearest the school, is selected as the place of attendance, unless by written request of parent or guardian they are permitted to attend regularly elsewhere.

SPECIAL STUDIES.

Young men, suitably qualified, may be received into the school after due examination, as Special Students, to pursue a part of the studies of the regular course, on condition that their time shall be fully and profitably occupied.

DIPLOMAS.

Students who have completed the full course of study, and have maintained a fair standing in deportment, study, and work, will receive a diploma of graduation.

EXPENSES.

By the liberality of the State the Trustees are enabled to offer first-class instruction at the low rate of $10.00 per term, or $25.00 per year; $10.00 payable at the opening of the first and second terms each, and $5.00 at the opening of the third: arrangements are made for remitting this charge in worthy cases, making tuition free to those not able to pay it.

No charge is made for furnished rooms. Table board is furnished at cost. At the end of each quarter, the expenses of the boarding department for the term are divided among the whole number present, and the price averages about $2.50 per week.

Text-books, fuel, lights, and washing, are furnished at cost also. Students should provide themselves with an ample supply of towels, and these, together with all handkerchiefs and wearing apparel, should have the owner's name plainly marked upon them, so as to guard against loss.

Individual records of labor, other than that performed for the purposes of instruction, will be kept, and reasonable compensation allowed for it.

SELF-HELP.

Extra labor, as far as practicable, will be furnished to all those who desire it towards self-support, when it can be performed without interference with regular duties, and industrious pupils can do much towards paying their expenses; sometimes a few earn nearly enough to pay the whole of them.

HOURS OF LABOR AND STUDY.

During the fall and winter term, when the necessities of the farm demand it, and the weather permits, the students are required to spend three hours daily upon the farm, and six or more upon study, laboratory work, and recitations, a part going upon the farm in the forenoon and the others in the afternoon; and during the spring term, five hours a day may be required upon the farm, when there is special need of that amount of work, and five or more in school work.

Under the direction of the farm Superintendent, the students do all kinds of farm work, including care of stock, milking, and general chores.

Address all inquiries or communications to STORRS' AGRICULTURAL SCHOOL, Storrs, Conn.

COURSE OF INSTRUCTION.

JUNIOR CLASS.

Chemistry, Physical Geography, Arithmetic, English.	Continued through the year.

MIDDLE CLASS.

Fall Term.	Winter Term.	Spring Term.
Chemistry,	Botany,	Chemistry,
Agriculture,	Chemistry,	Zoölogy,
Human Physiology,	Agriculture,	Book-Keeping,
Anatomy of Domestic Animals,	Physics,	Algebra,
Dairying,	Zoölogy,	Botany,
Physics,	Algebra,	Physics,
English.	English.	English.

SENIOR CLASS.

Fall Term.	Winter Term.	Spring Term.
Stock Breeding,	Agriculture,	Geology,
Entomology,	Cattle Feeding,	Chemistry,
Chemistry,	Chemistry,	Land Surveying,
Botany,	Geometry,	Botany,
Geometry,	Zoölogy,	Science of Government and Political Economy,
English.	English.	English.

LIST OF TEXT-BOOKS USED.

Johnson's How Crops Grow.
Armsby's Cattle Feeding.
Miles' Stock-Breeding.
Shepard's Inorganic Chemistry.
Remsen's Organic Chemistry.
Stoddard's Qualitative Chemistry.
Muter's Quantitative Chemistry.
Martin's Human Body.
Gray's Lessons and Manual of Botany.
Dana's Text-Book of Geology.
Steele's Physics.
Bradbury's Arithmetic.
Wentworth's Algebra.
Wentworth's Geometry.
Wentworth's Trigonometry.
Wentworth's Surveying.
Hyde's Lessons in English.
Whitney's Essentials of English.
Chittenden's Composition.

No changes have been made in our corps of instructors during the year, and the work has progressed without any radical modifications of the course of study and instruction reported at the close of 1889.

The Annual Commencement was held in June, at the close of the school year, when the following programme was presented by the graduating class of thirteen young men:

COMMENCEMENT EXERCISES, JUNE 20TH.

INVOCATION.

Music.

E. H. BRANDT, - - - - - - Manchester
"Our Agricultural Institutions."

M. E. BROWN, - - - - - - Coventry
"The Farmer and the Grange."

C. J. GILMORE, - - - - - - Hartford
"Profit on the Farm."

W. L. GOODENOUGH, - - - - Burrville
"An Ideal Farmer."

L. Hull, - - - - - North Stonington
"What Breeding Has Done for the American Trotter."

Music.

C. B. LANE, - - - - - Killingworth
"Dairying."

C. E. LANE, - - - - - Killingworth
"Irrigation and Drainage."

GEORGE NETH, - - - - Winchester Center
"The Sources of Plant Food."

C. B. POMEROY, JR., - - - - Willimantic
"The West or New England, Which ?

R. G. SHEPARD, - - - - South Manchester
"Origin and Classification of Soils."

A. C. STERNBERG, - - - West Hartford
"Theory and Practice."

J. H. WEEMS, - - - - West Cornwall
"Looking Backward Upon New England Agriculture.
1990 — 1890."

W. L. WETMORE, - - - - Winchester
"Siloes and Silage."

Music.

Addresses — State Master George Austin Bowen, Professor W. O. Atwater, Mr. J. H. Hale.

Awarding of Prizes.

Conferring of Diplomas.

Prizes, twenty-six dollars in gold : the 1st $15.00, 2d $8.00, and 3d $3.00, were given by the Connecticut Dairymen's Association for the best essays upon "Breeds and Breeding of Dairy Stock," and an oral examination upon the general subject of Agriculture.

Clarence B. Lane won the 1st prize, Latham Hull 2d, A. C. Sternberg, Jr., 3d.

We hope that the Dairymen's Association will feel disposed to make this an annual offer to the students.

The graduates of the school offer for next year a prize of ten dollars to the student of the graduating class passing the

best examination upon *Practical Agriculture*, the examining committee to be chosen by the graduates from among their own number.

THE ALUMNI ASSOCIATION.

All the graduates of the school, now numbering 64, are eligible to membership, and the annual meeting is held on Commencement Day at the school. The object of the association is to cultivate fraternal relations, and for mutual improvement; also to work for the highest interests of the school. The present officers of the association are:

DR. ANDREW HYDE, President,
J. H. GARDNER, JR., Secretary,
M. CHAPMAN, Treasurer.

THE WINTER COURSE OF LECTURES.

That the students might get the benefit of conducting the correspondence and the business management of the course, the organization and control of the winter series of lectures was turned over to them, they, upon conference with the principal, engaging the lecturers and assuming the responsibility, which resulted in the following course of lectures:

Jan. 31st. Ornithology, by Rev. C. M. Jones of Eastford.

Feb. 14th. The Paris Exhibition, Principal J. H. Washburn of Kingston, R. I.

Feb. 21st. What Shall I Do with Life? (Free Trade), Mr. J. L. Cowles of Farmington.

March 14th. Outs and Ins of Edinborough, Rev. N. S. Moore of Storrs.

March 21st. Protection, Mr. J. M. Hubbard of Middletown.

READING-ROOM.

The reading-room is supplied with a considerable number of the leading agricultural papers of the United States, besides the most important daily and weekly papers of the State; almost exclusively the gift of the publishers.

THE LIBRARY

Now contains over 1,600 books and pamphlets, acquired by gift and purchase. With new accommodations it can be much enlarged with advantage. More books for reference in the various lines of study are needed. If not furnished by the State may we not hope that some liberal-minded persons will supply our want.

INVENTORY.

Office,	$18.00
Library,	1,250.00
Physical and chemical apparatus and chemicals,	1,200.00
Natural history outfit,	150.00
Household furniture and outfit,	2,200.00
Kitchen " " "	275.00
Provisions on hand,	141.60

Tons of coal, 6.

LABOR OF STUDENTS.

Permanent improvements on the farm, 1,948¾ hours, @ 8c. per hour,	$155.90
General farm work, 11,716⅜ hours, @ 8c.,	937.31
For the school, 748½ hours, @ 8c.,	59.88
For the boarding department, 2,168 hours, @ 8c.,	173.50
For the ex. station, 2,315¼ hours, @ 8c.,	185.22
Total amount earned by the students at all kinds of labor during the year,	1,511.81

SCHOOL EXPENSES.

Text-books,	$360.72
Books for library, and stationery,	61.53
Printing,	115.30
Chemicals,	12.92
Other supplies,	76.68
Repairs on buildings,	5.54
Student labor,	59.88

GENERAL.

Postage,	46.28
Telephone,	34.94
Water rent,	10.00
Freight and express,	164.16
Rent of church slips for students,	15.00
Traveling expenses,	66.26

BOARDING DEPARTMENT.

Provisions,	Beef and pork purchased,	$354.80
	Fish and oysters,	98.27
	Flour,	203.20
	All other,	1,017.35
Fuel and lights,		66.72
Dormitory and kitchen outfit,		302.13
Other purchases,		21.11
Repair of buildings,		31.86
Servant hire,		728.68
Matron,		400.00

LIVE STOCK ON THE FARM NOV. 30, 1890.

CATTLE.

2 pairs of working oxen,	$225.00
12 grade cows,	360.00
2 thoroughbred Guernsey cows,	200.00
8 half-blood Guernsey heifers, 2 years,	160.00
4 half-blood Guernsey heifers, 1 year,	60.00
1 half-blood Guernsey heifer calf,	12.00
1 thoroughbred Guernsey bull calf,	20.00

HORSES.

1 pair of farm-horses, 8 years old,	400.00
2 carriage horses,	150.00

SWINE.

1 fat hog,	23.40
4 Berkshire breeding sows,	60.00

POULTRY.

20 Plymouth Rock fowls,	10.00
	$1,680.40

FARM IMPLEMENTS ON HAND NOV. 30, 1890.

Aggregate valuation,	$715.00
Quarry, joiner's, and all other tools,	60.00
	$775.00

AMOUNT AND VALUE OF FARM AND GARDEN PRODUCTS.

55	tons of upland hay,	$550.00
5	tons of rowen hay,	60.00
12	tons of swamp hay,	72.00
6	tons of bedding hay,	24.00
1½	tons of straw,	15.00
1	ton of corn stover,	8.00
65	tons of ensilage,	162.50
½	ton of squashes,	15.00
1	ton of beets, carrots, and turnips,	10.00
530	bushels of ears of field corn,	159.00
75	bushels of ears of sweet corn,	15.00
15	bushels of rye,	9.00
23	bushels of oats,	11.50
134	bushels of potatoes,	80.40
15	bushels of parsnips,	7.50
5	bushels of table beets,	2.50
5	bushels of onions,	3.75
6	bushels of White Rock turnips,	1.50
15	bushels of tomatoes,	15.00
5	bushels of cucumbers,	3.00
5	bushels of pole beans,	3.75
10	bushels of peas,	10.00
9	bushels of apples,	6.00
3	bushels of pears,	3.00
700	heads of celery,	21.00
200	cabbages,	12.00
	peppers,	2.00
200	heads of lettuce,	4.00
	rhubarb and other vegetables,	5.00
141	quarts of strawberries,	21.15
113	quarts of raspberries,	13.56
4,985	gallons of milk,	598.20
2,183	pounds of pork,	133.67

3,218 pounds of beef,	$141.42
138 pounds of veal,	6.21
75 pounds of poultry,	11.25
2 calves raised,	32.00
98 dozen of eggs,	19.60
49 cords of wood,	171.50
	$2,439.96

LABOR ON PERMANENT IMPROVEMENTS.

REMOVING ROCKS FROM LANDS ON HILL.

Labor of men, 278 hours,	$55.60
Labor of students, 1,566 hours,	125.28
Labor of teams, 372 hours,	74.40
	$255.28

GRADING FOR NEW FARM SHED.

Labor of students, 78 hours,	$6.24
Labor of men, 24 hours,	4.80
Labor of teams, 17 hours,	3.40
	$14.44

GRADING HIGHWAY.

Students, 28½ hours,	$2.28
Man, 7½ hours,	1.50
Teams, 10 hours,	2.00
	$5.78

EXCAVATING FOR AND GRADING ABOUT NEW PIGGERY.

Labor of students, 73 hours,	$5.84
Labor of man, 34 hours,	6.80
Labor of teams, 35 hours,	7.00
	$19.64

LABOR ON DAM FOR ARTIFICIAL POND.

Labor of students, 57 hours,	$4.56
Labor of man, 19 hours,	3.80
Labor of teams, 39 hours,	7.80
	$16.16
Building cellar for storing celery,	$8.48
Building driveway near farm barn,	9.72
Removing rocks from roadside,	4.24
Removing apple trees from mowing lands,	7.66
Total of labor on permanent improvements,	$341.40

REPORT OF PROFESSOR CHAMBERLAIN.

To the Trustees of the Storrs Agricultural School:

GENTLEMEN, — By your requirement it becomes my duty to submit this, my seventh annual report of the farm. Beyond the details furnished for your information by the accompanying tables, showing the kind and amount of crops grown, the value of each, the number and value of live stock, and the cost of such improvements as have been made during the year, little needs to be stated. The influences that have resulted in such an abundant yield of hay, or in such a scanty yield of oats, throughout New England, have been as marked here as elsewhere.

I wish, however to direct your attention to the fact that the per cent. of increase in our hay crop has been steady from year to year, showing that improved cultivation rather than climatic conditions must be relied upon in the production of this most essential crop. Quite an area of oats was sown, where all the conditions seemed to favor a large yield, but the universal blight was so severe that most of this crop was ensilaged, and used to supplement the pasture feed in the late summer months. Nearly an acre of winter wheat, sown to test its adaptation to our soil, suffered quite as much from the same cause, and was utilized as silage.

The earlier potatoes were nearly ruined by the short but sharp drouth, while the later ones, of the same varieties, decayed so largely as to reduce the yield fully one-half. Our corn crop was excellent, and was harvested in the finest condition. Nearly five acres of stover, besides an acre of cow peas, and a small amount of Hungarian were placed in the silo in alternate layers, so as to afford an occasional change of diet to animals whose appetites demand variety as much as our own do. The silo offers every facility for gratifying this demand, and affords the safest and most economical plan for storing our many forage crops.

The dairy has been devoted exclusively to supplying milk and butter to the boarding department of the school. The labor in the creamery has, as heretofore, been chiefly performed by the students, some of whom are always glad in this way to qualify themselves for similar work at home or elsewhere. During the year a new and more commodious Stoddard creamer was substituted for the old and well-worn creamer of the same manufacturer.

The erection of a new piggery and the possible removal of the old one marks one more step towards the better equipment of the farm for its future usefulness, and relieves the public view of one of its most offensive features. The new building is thirty-eight feet in length by fifteen feet in width, with eleven-foot posts. Above will be ample space for the storage of bedding. Below there will be a room, fourteen by fifteen feet, combining good facilities for heating or boiling, feeding, and slaughtering, the remaining twenty-four feet being divided into suitable pens for breeding, fattening, and growing animals. The building is nearly completed. Other buildings are still needed for the protection of our more expensive farm implements, especially for our farm wagons, carts, and the more bulky machines for harvesting our hay crop. We desire to suggest the economy as well as convenience of such buildings. The labor department becomes more and more important, as the number of students seeking employment, as a necessary condition of their education, annually increases. The new and attractive buildings, erected during the present year for their better accommodation, will, no doubt, find their capacity fully tested in the near future, and the demand for labor will be proportionately increased. Let me suggest that improvements upon a larger plan than have yet been attempted might be made, with your consent, and under your direction.

In closing my brief and very cursory report, allow me to say that very much has been excluded from it of paramount importance to the farm, to be presented for your consideration at some time.

All of which is respectfully presented,

L. P. CHAMBERLAIN,

Farm Superintendent.

REPORT OF PROFESSOR PHELPS.

To the Trustees of the Storrs Agricultural School:

GENTLEMEN, — The lines of instruction coming under my control have remained essentially as last year. A general course, thought to be well suited to an institution of this kind, was mapped out two years ago, and may be found in my report as published in the School Report for 1888. The schedule of studies gives the

amount, and place in the course, of the agricultural instruction, as now arranged.

Much of the instruction is necessarily given in the form of lectures. Suitable text-books on many subjects are not to be found. Cyclostyled sheets, for the use of the Middle class, giving briefly the essential points of the subject under consideration, have proved very serviceable. Much more time is left for explanation, and the student is not obliged to take notes. With the Seniors, however, the lectures are given in the usual way, and each student is required to take down the substance of the lecture. Skill in taking notes is important, and training in this direction should not be overlooked.

The general plan of the course is to begin with a brief history of agriculture, ancient and modern; secondly, to enter into a study of soils, manures, and fertilizers, and the relation of these to plant-life and plant growth; and, lastly, a study of the higher forms of life, as represented in our domestic animals. Stock-breeding, breeds of live-stock, and cattle-feeding occupy a large part of the time of Senior year.

It is earnestly hoped that better facilities for class room illustration will be afforded at an early date. Charts, models, collections of specimens, implements, — in fact, a general agricultural museum, is greatly needed.

Much interest was created last year, in the Senior class, by the announcement that prizes were to be offered for the best essays on some special subject gone over by the class, together with an oral examination on the agricultural work of the course. The latter was held on the morning of Commencement Day, the exercises being open to the public. The subject chosen by the class for the essays was, "Breeds and Breeding of Dairy Stock." The gift was the generous offer of the Connecticut Dairymen's Association, and consisted of twenty-six dollars in gold, divided into three prizes, of fifteen, eight, and three dollars. It is hoped that a prize of this kind may be made a permanent feature, as it will stimulate a lively competition among the students, and afford the public an opportunity of seeing some results of the work of the course.

The work of the Experiment Station has been made of value to the students as far as seemed possible. The stations of this country have been well called the "farmer's schools," while the agricultural colleges and schools are intended more especially for farm-

ers' sons. The work of the experiment stations is outlined in the act of Congress under which they were established. In no case should the funds be used directly for purposes of instruction. Work is provided the students as far as seems advisable. Much of this is better done by the young men than by the average farm workman. The means of illustration afforded by the experiments under way are of much value. New fodder crops are grown; fertilizer experiments on grass and corn have been started, with the purpose of continuing through a series of years; while in the grass garden may be found nearly all of our native grasses. An observing student will acquire much from having such experiments carried out under his eye. A detailed report of the experiments will be found in the reports and bulletins of the station.

Respectfully submitted,

C. S. PHELPS.

REPORT OF PROFESSOR HUTTON.

To the Trustees of the Storrs Agricultural School:

GENTLEMEN, — In submitting a report for the past year on the work of the school embraced in my department, there is little of note to record.

The subjects are stated elsewhere, as well as the position they occupy in the course of study. As these were somewhat fully outlined in my report for last year, I need not repeat the same, but would respectfully refer you to that for further particulars.

While nothing unusual has transpired in my own work during the past year, it is a pleasure to refer to the improvement that has been made in our equipment generally, by the erection of the new buildings, as well as in the increase in material and accommodation. Additions, as required, have been made to the supply of apparatus, thus putting the school in a position to do better work than heretofore.

In the course of instruction here it is endeavored constantly to keep in mind the primary object of the school, *viz.:* to educate young men for the farm, not from it. Nor is the fact overlooked that education consists not less in the training of the mind than in the gaining of information.

In the occupation of teaching there is both pleasure and labor, which, though physically light, mentally is not always so. But nothing tends so much to lighten the work of instruction, and make it agreeable to both teacher and class, as a love for study, and a desire for more knowledge. Not a few of the students that enter this school have not had the best educational advantages, and hence find difficulty in taking up new studies, and in grasping new ideas. Such, however, frequently prove our best students, when made conscious of their lack of knowledge, and instilled with a love for more. It is gratifying indeed to note the interest manifested by the students generally in all that pertains to their improvement in any way. With few exceptions, and such are found in every school, they are inspired with a sincere determination to improve their time and opportunity in acquiring as much as possible in their short course here.

Respectfully, J. R. HUTTON.

REPORT OF MISS NETTLETON, TEACHER.

To the Trustees of the Storrs Agricultural School:

GENTLEMEN, — In compliance with your request, I submit the following report:

As you are aware, instruction given by me is chiefly to the Junior class. The studies of this department and time devoted to each may be found in the schedule.

MATHEMATICS.

The study of Arithmetic is pursued by the Junior class through the entire year. Careful and thorough preparation of work is required, and the aim is to prepare the student to apply his knowledge to practical use.

During two terms of the year instruction in Algebra is given to the Middle class; the time allotted to the study enabling us to consider the subjects taken from the beginning (omitting such portions as seem advisable), through Factoring, Fractions, and Problems producing Fractional Equations.

ENGLISH.

This study is also pursued by the Junior class during the year. The methods of instruction are, recitations from text-books, cor-

rection of exercises in false syntax, study of synonyms, practice in letter-writing, reproduction of selections read in class, and regular practice in composition.

The most to be obtained from the Senior, also the Middle, class in the limited time assigned to English, is from practice in composition. This is regularly required, and many of the students give evidence of commendable effort in the production of creditable essays. Two evenings, at least, in each term rhetorical exercises are given by the students, and the benefit derived from this practice is worthy of mention.

PHYSICAL GEOGRAPHY.

This topic has been added to the list of studies pursued by the Junior class, and much interest has been manifested in this important subject.

BOOK-KEEPING.

The instruction in Book-keeping embraces single entry, and the aim is to prepare the student to keep accounts with accuracy.

In additition to class-room duties, assistance in clerical work relating to school accounts has been given the principal when desired.

Respectfully submitted,

J. NETTLETON.

REPORT OF THE MATRON.

To the Trustees of the Storrs Agricultural School:

GENTLEMEN, — There has been very little change in the work and management of my department during the year.

The 6th of December, the grand moving day to the new dormitory, was celebrated among the students by appropriate exercises; and the warmth, comfort, and handsome furnishings of their new rooms are duly appreciated.

The healthfulness of the school during the year has been the subject of remark. With the exception of "la grippe," of which we had full share, there has not been a case of serious illness among the students.

Our house-furnishings, together with those of the table, have been replenished from time to time, as necessity required, and are

now in as good condition as they have been at any time since my acquaintance with the school.

From our garden and other sources we obtained about five hundred quarts of small fruits, which were prepared for the use of the boarding department.

The average price of table board for the year was $2.50 per week.

Very respectfully submitted,

CATHARINE E. HILLIARD.

TREASURER'S REPORT.

H. C. Miles, *Treasurer*,

In account with Storrs Agricultural School.

1889. Dr.

Sept.	3.	By cash, J. P. Barstow,	$ 35.00
Oct.	2.	" " Comptroller,	2,000.00
Nov.	13.	" " Experiment Station,	66.75
"	13.	" " note discounted,	1,481.25
Dec.	18.	" " Experiment Station,	75.25
"	28.	" " J. P. Barstow,	3.72
1890.			
Jan.	4.	" " Comptroller,	2,000.00
"	10.	" " B. F. Koons,	115.31
"	14.	" " " "	176.88
"	25.	" " " "	100.00
"	25.	" " L. P. Chamberlain,	33.24
Feb.	10.	" " note discounted,	1,472.75
"	19.	" " Experiment Station,	194.77
Apr.	3.	" " Comptroller,	2,000.00
"	14.	" " B. F. Koons,	183.89
May	7.	" " Experiment Station,	90.77
"	29.	" " note discounted,	1,468.50
June	30.	" " Experiment Station,	41.60
July	9.	" " Comptroller,	2,000.00
			$13,537.68

1890. Cr.

June	30.	Paid salaries,	$3,455.13
	30.	" Boarding Department,	1,455.20
	30.	" Farm labor,	703.61
	30.	" Furniture,	368.55
	30.	" Fuel and lights,	625.72

June 30.	Paid	Farming tools and repairs,	$148.15
30.	"	Telephone and advertising,	179.76
30.	"	Fertilizers, seeds, and feed,	581.31
30.	"	Materials and repairs,	352.58
30.	"	Books and stationery,	326.00
30.	"	Insurance,	16.50
30.	"	Chemicals,	35.35
30.	"	Ice,	70.15
30.	"	Farm stock,	70.00
30.	"	Sundries,	386.24
30.	"	Notes,	3,000.00
30.	"	" and interest,	1,020.50
			$12,794.75
30.	Balance of account,		742.93
			$13,537.68

Frank L. Rodgers and W. C. Durand, Auditors of Public Accounts, certify that this statement is correct.

STATE OF CONNECTICUT.

ANNUAL REPORT

OF

The Connecticut Agricultural

EXPERIMENT STATION

For 1890.

PRINTED BY ORDER OF THE GENERAL ASSEMBLY.

NEW HAVEN:
TUTTLE, MOREHOUSE & TAYLOR, PRINTERS.
1891.

OFFICERS AND STAFF FOR 1890.

STATE BOARD OF CONTROL.

Ex-officio.

HIS EXC. MORGAN G. BULKELEY, *President.*

Appointed by Connecticut State Agricultural Society:	Term expires
HON. E. H. HYDE, Stafford, *Vice-President.*	July 1, 1891.
Appointed by Board of Trustees of Wesleyan University:	
PROF. W. N. RICE, Middletown.	1891.
Appointed by Governor and Senate:	
EDWIN HOYT, New Canaan.	1892.
H. L. DUDLEY, New London.	1893.

EXECUTIVE COMMITTEE.

Appointed by Board of Agriculture:

T. S. GOLD, West Cornwall.	1892.
Appointed by Governing Board of Sheffield Scientific School:	
W. H. BREWER, New Haven, *Secretary and Treas.*	1893.
Ex-officio.	
S. W. JOHNSON, New Haven, *Director.*	

Chemists.

E. H. JENKINS, PH.D., *Vice-Director.*
A. L. WINTON, JR., PH.B.
T. B. OSBORNE, PH.D.
R. S. CURTISS, PH.B.*
A. W. OGDEN, PH.B.†

Mycologist.

ROLAND THAXTER, PH.D.

Stenographer and Clerk.

MISS F. M. BIGELOW.

In charge of Buildings and Grounds.

CHARLES J. RICE.

Laboratory Helper.

HUGO LANGE.

* Till Oct. 1st. † From Oct. 1st.

ANNOUNCEMENT.

THE CONNECTICUT AGRICULTURAL EXPERIMENT STATION was established in accordance with an Act of the General Assembly approved March 21, 1877, "for the purpose of promoting Agriculture by scientific investigation and experiment."

The Station is prepared to analyze and test fertilizers, cattle-food, seeds, milk, and other agricultural materials and products, to identify grasses, weeds, useful or injurious insects, moulds, blights, mildews, etc., and to give information on various subjects of Agricultural Science, for the use and advantage of the citizens of Connecticut.

The Station makes analyses of Fertilizers, Seed-Tests, etc., etc., for the citizens of Connecticut, without charge, provided—

1. That the results are of use to the public and are free to publish.

2. That the samples are taken from stock now in the market, and in accordance with the Station instructions for sampling.

3. That the samples are fully described and retail prices given on the Station "Forms for Description."

The officers of the Station will take pains to obtain for analysis samples of all the commercial fertilizers sold in Connecticut; but the organized coöperation of farmers is essential for the full and timely protection of their interests. Granges, Farmers' Clubs and like Associations can efficiently work with the Station for this purpose, by sending in duly authenticated samples early during each season of trade.

All other work proper to the Experiment Station that can be used for the public benefit will be done without charge. Work for the use of individuals will be charged for at moderate rates. The Station will undertake no work, the results of which are not at its disposal to use or publish, if deemed advisable for the public good.

Results of analysis or investigation that are of general interest will be published in Bulletins, of which copies are sent to each Post Office in this State, and to every citizen of the State who applies for them. These results will be summed up in the Annual Reports made to the Governor.

It is the wish of the Board of Control to make the Station as widely useful as its resources will admit. Every Connecticut citizen who is concerned in agricul-

ture, whether farmer, manufacturer, or dealer, has the right to apply to the Station for any assistance that comes within its province to render, and the Station will respond to all applications as far as lies in its power.

☞ Instructions and Forms for taking samples, and Terms for testing Fertilizers, Seeds, etc., for private parties, sent on application.

☞ Parcels by Express, to receive attention should be *prepaid*, and all communications should be directed, *not to any individual officer*, but simply to the

AGRICULTURAL EXPERIMENT STATION,
NEW HAVEN, CONN.

☞ Station Grounds, Laboratories and Office are on Suburban st., between Whitney avenue and Prospect st., 1⅝ miles North of City Hall. Suburban st. may be reached by the Whitney ave. Horse Cars, which leave the corner of Chapel and Church sts. three times hourly, viz: on the striking of the clock and at intervals of twenty minutes thereafter.

☞ The Station has Telephone connection and may be spoken from the Central Telephone Office, 118 Court st., or from Peck & Bishop's Office in Union R. R. Depot.

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REPORT OF THE BOARD OF CONTROL.

To His Excellency, Morgan G. Bulkeley, Governor of Connecticut :—

The Board of Control of the CONNECTICUT AGRICULTURAL EXPERIMENT STATION respectfully submits its Annual Report for the year ending November first, 1890 :

As required by the act concerning Commercial Fertilizers the Station has made and published one or more analyses of all brands offered for sale in the State so far as it has been able to obtain them. The Station employed special deputies during April and May last who visited 84 towns and a considerably larger number of villages in all parts of the State and drew from stock in the hands of dealers 468 samples of fertilizers. One hundred and forty-six distinct brands of fertilizers are known to be on sale but the analyses of manures and manurial waste products, etc., has increased the total number of fertilizer-analyses to 310.

The examinations of suspected butter, molasses and vinegar desired by the Dairy Commissioner, while not obligatory on the Station have yet been made gratuitously whenever called for and expert testimony has been furnished in court whenever required. Thirty-one samples of molasses, 12 of maple syrup, 33 of vinegar and 15 of butter or oleomargarin have thus been examined within the year.

Thirteen other samples of butter and 106 samples of milk have also been examined, chiefly for dairy farmers or for creameries, to test the milk of herds or to discover suspected watering or skimming.

Some 45 or 50 samples of feeding stuffs have been analyzed or are now being analyzed, a part of them at the request of stock-feeders who are using bought feed, and a part in connection with the field experiments of the Station.

As usual a very considerable amount of time has been spent in the testing of analytical methods, particularly those for the determination of phosphoric acid in fertilizers and for the rapid estimation of fat in milk.

The nature and composition of the albuminoids or proteids of oats have been the subject of extended study by Dr. Osborne, who has also worked upon the proteids of maize, under the advice of Professor R. H. Chittenden, in the Sheffield biological laboratory of Yale University.

The following field experiments have been carried out this year under the superintendence of Dr. Jenkins, Vice-Director.

1. An experiment coöperative with a number of other Stations "to study the composition of corn grown in different localities and to determine the influence of climatic conditions on varieties of corn native to one latitude when moved to a higher or lower latitude."

2. An experiment on the relative yield and chemical composition of corn planted in hills and in drills.

3. An experiment on the continuous growth of corn year after year on the same land, fertilized *a.*) with farm manure, *b.*) with commercial fertilizers.

4. A continuous experiment to test the relative yearly yield of potatoes from seed of different size, when the selection of seed is practiced for a course of years.

5. A special nitrogen experiment with potatoes.

6. An experiment on the relative value of certain raw phosphates and superphosphate.

In connection with investigations regarding grasses, 18 samples of orchard grass seed collected in the markets of the State, as well as in New York and Boston, have been tested with regard to their purity and vitality.

Mr. J. B. Olcott has had charge of the Forage Garden on the Station Grounds and also, in coöperation with the Station, has established on his farm in South Manchester a more extensive plantation of valuable or promising grasses for the purpose of obtaining pure seed and especially of observing for a series of years the characters of varieties of common species which he has gathered and intends gathering from various localities in this and other States, territories and countries.

During the past year Dr. Thaxter, Mycologist to the Station, has continued the study of fungus diseases of plants, with field experiments for the prevention of certain of them affecting the onion, quince, grape, etc. The special subject of the season has been the disease known as potato scab. By means of artificial cultivation and inoculations, the cause of this disease as it occurs in Connecticut has been shown to be a peculiar fungus. The subject is still undergoing investigation.

Four bulletins containing 45 octavo pages have been issued during the year and mailed to each newspaper, postmaster, and secretary of a farmer's organization and to more than 6500 citizens of the State.

Ten weekly statements have likewise been issued to bring the results of laboratory work more promptly before farmers. These are sent to leading agricultural papers and to each secretary of a farmers' organization.

For a detailed account of the work of the Station reference must be had to the Report of the Director now in preparation.

The accompanying Report of the Treasurer exhibits the financial affairs of the Station for the fiscal year which ended June 30, 1890.

All of which is respectfully submitted.

WILLIAM H. BREWER, *Secretary.*

New Haven, Conn., October 31, 1890.

REPORT OF THE TREASURER.

WM. H. BREWER, *in account with the Connecticut Agricultural Experiment Station for the fiscal year ending June 30th, 1890.*

RECEIPTS.

From the State Comptroller	$8,000.00	
From the U. S. Treasurer	7,500.00	
Analysis Fees due from previous fiscal year, collected this year	260.00	
Analysis Fees of the fiscal year	3,961.50	
Miscellaneous Receipts	47.03	
		$19,768.53

EXPENDITURES.

	State Account.	United States Account.	Total.
Salaries	$5,130.00	$6,465.00	$11,595.00
General Laboratory expenses	1,126.83		1,126.83
Mycological expenses		122.77	122.77
Grass and Forage Investigation	580.06		580.06
Field Experiments		441.56	441.56
Gas	254.55		254.55
Water	147.00		147.00
Coal	547.00		547.00
The Establishment, Repairs, Grounds, etc.	565.74		565.74
Improvements, other than ordinary Repairs	2,093.88		2,093.88
Finishing Mycological Laboratory		284.13	284.13
Telephone	96.83		96.83
Printing	636.74	186.54	823.28
Postage	92.46		92.46
Stationery	179.47		179.47
Library	260.65		260.65
Traveling expenses of the Board of Control	20.36		20.36
Collecting Fertilizers	319.74		319.74
Unclassified Sundries	217.22		217.22
	$12,268.53	$7,500.00	$19,768.53

MEMORANDUM.

The year's accounts were audited September 19, 1890, by the Auditors of the State Public Accounts.

The Analysis Fees of certain fertilizers believed to have been on sale in the State since May 1st and subject to the law concerning the sale of fertilizers, if hereafter collected will go to the new account.

WILLIAM H. BREWER, *Treasurer.*

REPORT OF THE DIRECTOR.

On the following pages is a full report of the work done by this Station during the year in the analysis of fertilizers, with a review of the market quotations of fertilizer chemicals and manurial waste products for the year.

The investigations in the botanical laboratory and the field observations and experiments of the mycologist are reported by Dr. Thaxter.

A paper by Dr. Osborne gives in full the method and results of his work on the proteids of the oat kernel.

Most of the analyses of feeding stuffs made during the year are discussed and also the results of a field experiment on the effects of growing maize in hills and drills.

These papers cover more than 200 pages, the limit prescribed by State law, and the expense for the additional printing is borne by the Station. There still remains a considerable amount of material which cannot be printed for lack of space. This includes the report of the examinations of seeds, analyses of potatoes, work done for the Dairy Commissioner and a coöperative experiment on the composition of corn grown in different localities.

The discussion of the experiments with potatoes it is deemed best to defer till further results have been obtained.

THE CONNECTICUT FERTILIZER LAW.

The General Assembly at its session in 1882 passed a Fertilizer Law which went into effect September 1, 1882, and which repealed and took the place of all previous legislation on this subject. The law is still in force without any amendment.

Copies of the law may be had on application to the Station. Attention is specially called to the following requirements.

1. In case of fertilizers that retail at ten dollars or more per ton, the law holds the SELLER responsible for *affixing a correct label or statement* to every package or lot sold or offered, as well as for the *payment of an analysis fee* of ten dollars for each fertilizing ingredient which the fertilizer contains or is claimed to contain, *unless* the MANUFACTURER OR IMPORTER shall have provided labels or statements and shall have paid the fee. Sections 1 and 3.

The Station understands "the fertilizing ingredients" to be those whose determination in an analysis is necessary for a valuation, viz: Nitrogen, Phosphoric acid and Potash. The analysis-fees in case of any fertilizer will therefore be ten, twenty or thirty dollars, according as one, two or three of these ingredients are contained or claimed to exist in the fertilizer.

2. The law also requires, in case of any fertilizer selling at ten dollars or more per ton, that a *sealed sample* shall be deposited with the Director of the Station by the MANUFACTURER OR IMPORTER, and that a *certified statement* of composition, etc., shall be filed with him.

A statement of the per cents. of Nitrogen, Phosphoric acid (P_2O_5) and Potash (K_2O), and of their several states or forms, will suffice in most cases. Other ingredients may be named if desired.

In all cases the per cent. of *nitrogen* must be stated. Ammonia may also be given when actually present in ammonia salts, and "ammonia equivalent to nitrogen" may likewise be stated.

The per cent. of soluble and reverted phosphoric acid may be given separately or together, and the term "available" may be used in addition to, but not instead of soluble and reverted.

The percentage of insoluble phosphoric acid may be stated or omitted.

In case of Bone, Fish, Tankage, Dried Meat, Dried Blood, etc., the chemical composition may take account of the two ingredients: Nitrogen, Phosphoric Acid.

For Potash Salts give always the per cent. of Potash (potassium oxide); that of Sulphate of Potash or Muriate of Potash may also be stated.

The chemical composition of other fertilizers may be given as found in the Station Reports.

3. It is also provided that EVERY PERSON in the State, who sells *any commercial fertilizer of whatever kind or price* shall annually report certain facts to the Director of the Experiment Station, and on demand of the latter shall deliver a sample for analysis. Section 4.

4. All "CHEMICALS" that are applied to land, such as: Muriate of Potash, Kainite, Sulphate of Potash and Magnesia, Sulphate of Lime (Gypsum or Land Plaster), Sulphate of Ammonia, Nitrate of Potash, Nitrate of Soda, etc.—are considered to come under the law as "Commercial Fertilizers." Dealers in these chemicals must see that packages are suitably labeled. They must also report them to the Station, and see that the analysis fees are duly paid, in order that the Director may be able to discharge his duty as prescribed in Section 9 of the Act.

It will be noticed that the State exacts no license tax either for making or dealing in fertilizers. For the safety of consumers and the benefit of honest manufacturers and dealers, the State requires that it be known what is offered for sale, and whether fertilizers are what they purport to be. With this object in view the law provides, in section 9, that all fertilizers be analyzed and it requires the parties making or selling them to pay for these analyses in part; the State itself paying in part by maintaining the Experiment Station.

OBSERVANCE OF THE FERTILIZER LAW.

MANUFACTURERS who have paid the Analysis Fees as required by the Law, and Fertilizers for which fees have been thus paid for the year ending May, 1891.

Firm.	*Brand of Fertilizer.*
Apothecaries Hall Co., Waterbury, Conn.	Victor Phosphate.
Baker, H. J. & Bro., 215 Pearl St., N. Y.	Pure Ground Bone. A. A. Ammoniated Superphosphate. Potato Fertilizer. Corn Fertilizer. Castor Pomace.
Bowker Fertilizer Co., 43 Chatham St., Boston, Mass.	Kainit. Pure Dry Fish. Stockbridge Tobacco Manure. " Corn and Grain Manure. " Forage Crop Manure. " Vegetable manure. " Fruit Manure. Bowker's Hill and Drill Phosphate. " Fish and Potash. " Ammoniated Dissolved Bone. " Fresh Ground Bone.
Bradley Fertilizer Co., 27 Kilby Street, Boston, Mass.	Bradley's Superphosphate. " Potato Manure. " Complete Manure for Potatoes and Vegetables. " for Top Dressing Grass and Grain. " for Corn and Grass. " Pure Fine Ground Bone. " Circle Brand Ground Bone with Potash. " Fish and Potash, Anchor Brand. " Fish and Potash, Triangle A Brand. B. D. Sea Fowl Guano. Original Coe's Superphosphate. Farmer's New Method Fertilizer.
Church, Joseph & Co., Tiverton, R. I.	Fish and Potash. Dry Ground Fish.
Coe, E. Frank, 16 Burling Slip, N. Y.	High Grade Ammoniated Bone Superphosphate. Red Brand Excelsior Guano. Gold Brand Excelsior Guano. Potato Fertilizer. Alkaline Bone. Ground Bone. Fish and Potash.

Firm.	*Brand of Fertilizer.*
Coe, Russell, Meriden, Conn.	Superphosphate.
Collier White Lead and Oil Co., St. Louis, by F. Ellsworth, Hartford.	Collier Castor Pomace.
Cooper's, Peter, Glue Factory, 17 Burling Slip, N. Y.	Pure Bone Dust.
Crocker Fertilizer & Chemical Co., Buffalo, N. Y.	New Rival Ammoniated Superphosphate. Buffalo Superphosphate No. 2. Special Potato Manure. Pure Ground Bone. Ammoniated Bone Superphosphate. Potato, Hop and Tobacco Phosphate. Queen City Phosphate. Vegetable Bone Superphosphate. Ammoniated Wheat and Corn Phosphate.
Cumberland Bone Co., Portland, Maine.	Cumberland Superphosphate. Seeding Down Fertilizer.
Darling, L. B. Fertilizer Co., Pawtucket, R. I.	Animal Fertilizer. Extra Bone Phosphate. Pure Ground Bone.
Davidge Fertilizer Co., 121 Front St., N. Y.	Davidge's Special Favorite. " Potato Manure. " Vegetator.
Downs & Griffin, Birmingham, Conn.	Ground Bone.
Fall, E. B., Middletown, Conn.	Ground Bone.
Farmers' Fertilizer Co., 230 W. Water St., Syracuse, N. Y.	Standard Special Formula. Fish and Potash.
Great Eastern Fertilizer Co., Rutland, Vt.	Great Eastern General Phosphate for Oats, Buckwheat and Seeding Down. Great Eastern General Fertilizer for Grass and Grain. Great Eastern Vegetable, Vine and Tobacco Fertilizer.
Kelsey, E. R., Branford, Conn.	Fish and Potash.
Lister's Agricultural Chemical Works, Newark, N. J.	Standard Superphosphate of Lime. Ammoniated Dissolved Bone. Celebrated Ground Bone.
Ludlam Frederick, 140 Maiden Lane, N. Y.	Ludlam's Cereal Fertilizer. " Cecrops Fertilizer.
Mapes Formula & Peruvian Guano Co., 158 Front St., N. Y.	Potato Manure. Complete Manure for Light Soils. " " for General Use. " " "A" Brand. Tobacco Manure, Connecticut Brand. " " Wrapper Brand. Fruit and Vine Manure.

Firm.	*Brand of Fertilizer.*
Mapes Formula & Peruvian Guano Co., 158 Front St., N. Y.	Peruvian Guano. Corn Manure. Fine Dissolved Bone. Seeding Down Manure. Grass and Grain Spring Top Dressing.
Miller, G. W., Middlefield, Conn.	Flour of Bone Phosphate. Pure Ground Bone.
Miller, H. S. & Co., Newark, N. J.	Harvest Queen Phosphate. Bone Meal. Special Potato Manure. Standard Superphosphate. Corn Fertilizer. Ammoniated Dissolved Bone.
National Fertilizer Co., Bridgeport, Conn.	Chittenden's Complete Fertilizer. " Ammoniated Bone Phosphate. " Fish and Potash. " Ground Bone.
Olds & Whipple, Hartford, Conn.	Olds & Whipple's Special Phosphate.
Peck Brothers, Northfield, Conn.	Pure Ground Bone.
Plumb & Winton, Bridgeport, Conn.	Bone Fertilizer.
Quinnipiac Co., 83 Fulton St., N. Y.	Quinnipiac Phosphate. " Pine Island Phosphate. " Potato Manure. Market Garden Manure. Fish and Potash, Crossed Fishes Brand. Fish and Potash, Plain Brand. Dry Ground Fish. Bone Meal.
Read Fertilizer Co., Box 3121, New York City.	Farmers' Friend Fertilizer. Lion Brand Fertilizer. High Grade Farmers' Friend. Bone, Fish and Potash.
Red Seal Castor Oil Co., St. Louis, Mo., by Olds & Whipple, Hartford.	Red Seal Castor Pomace.
Reese, J. S. & Co., New Bedford, Mass.	Bay State Fertilizer. Great Planet "A" Fertilizer. Reese's Concentrated Potato and Corn Manure. Reese's Concentrated Tobacco and Cabbage Manure. Reese's New England Favorite. Pilgrim Fertilizer. King Philip Alkaline Bone Superphosphate.
Rogers & Hubbard Co., Middletown, Conn.	Pure Raw Knuckle Bone Flour. Pure Ground AX Bone. Soluble Potato Manure. Fairchild's Corn Formula. " Seeding Down Formula.

Firm.	*Brand of Fertilizer.*
Sanderson, L., Long Wharf, New Haven, Conn.	Formula A. Sulphate of Ammonia. Dried Blood. Nitrate of Soda. Blood, Bone and Meat. Dissolved Bone Black. Muriate of Potash. Sulphate of Potash. Fine Ground Bone.
Shoemaker & Co., M. L., Philadelphia, by F. Ellsworth, Hartford.	Swift-Sure Superphosphate. Swift-Sure Bone Meal.
Stearns Fertilizer Co., 133 Water St., N. Y.	Ammoniated Bone Superphosphate. Potato Grower.
Stewart, W. D. & Co., 8 Congress St., Boston, Mass.	Soluble Pacific Guano. Pacific Fish and Potash.
Wilcox, Leander, Mystic Bridge, Conn.	Wilcox's Acidulated Fish Guano. " Dry Ground Fish Guano.
Wilkinson & Co., 54 Williams St., N. Y.	Economical Bone Fertilizer.
Williams & Clark Fertilizer Co., 81 Fulton St., N. Y.	Americus High Grade Special for Tobacco, &c. Potato Phosphate. Americus Ammoniated Bone Phosphate. Americus Pure Bone Meal. Royal Bone Phosphate.

ANALYSES OF FERTILIZERS.*

During 1890, 314 samples of fertilizers have been analyzed. Of these, a small number were examined for private parties and for testing methods in connection with other Experiment Stations, and the remainder for the general use of the citizens of the State.

During April and May last Messrs. F. R. Curtiss of Stratford and Dennis Fenn of Milford, agents of this Station, collected samples of Commercial Fertilizers in all parts of Connecticut.

Eighty-four towns and a considerable number of villages have been visited, distributed as follows:

Hartford Co.	17
Tolland Co.	7
Windham Co.	15
New London Co.	5
Middlesex Co.	11
New Haven Co.	10
Fairfield Co.	12
Litchfield Co.	7
	84

These gentlemen drew about 468 samples, using the method of sampling which is described on page 91 of the Report of this Station for 1884.

In this way one or more samples were secured of nearly every brand of fertilizer which is offered for sale within the State. When several samples of a single brand were drawn in different parts of the State the analysis was performed, not on any single sample, but on a mixture made of an equal weight of each of the several samples. Thus, it is believed, the average composition of the goods is more fairly represented than by the analysis of any single sample.

The Station agents are instructed in every case to open at least three packages of each brand for sampling, and if the number of packages is large, to take a portion from every tenth one, by means of a sampling tube which withdraws a section or core through the entire length of the bag or barrel.

* The matter of this and several subsequent pages, explanatory of the sampling and valuation of fertilizers, is copied, with a few alterations, from the Report for 1887. This repetition appears to be necessary for the use of readers who have not seen former Reports.

As a rule, the Station will not analyze samples—

1. From dealer's stock of less than one ton.
2. From stock which has lain over from last season.
3. From stock which evidently is improperly stored, as in bags lying on wet ground or exposed to the weather, etc.

The Station desires the coöperation of farmers, farmers' clubs, and granges in calling attention to new brands of fertilizers, and in securing samples of all goods offered for sale. All samples drawn by other than Station agents *must* be drawn in accordance with the Station's Instructions for sampling, and properly certified, if the Station analysis is desired. A copy of these instructions and blank certificates will be sent on application.

Samples are analyzed as promptly as possible in the order in which they are received. As soon as an analysis is completed a copy of it is sent to the party who furnished the sample, and also to the manufacturer, in order that there may be opportunity for explanation or protest, if desirable, before the results are published in the Bulletin.

The following "Explanations" are intended to embody the principles and data upon which the valuation of fertilizers is based, a knowledge of which is essential to a correct understanding of the analyses that are given on subsequent pages.

Explanations Concerning the Analysis of Fertilizers and the Valuation of their Active Ingredients.

Revised.

Nitrogen is the most rare, and commercially the most valuable fertilizing element.

Free Nitrogen is indeed universally abundant in the common air, but in this form its effects in nourishing vegetation are as yet obscure.

Organic Nitrogen is the nitrogen of animal and vegetable matters, which is chemically united to carbon, hydrogen and oxygen. Some forms of organic nitrogen, as those of blood, flesh and seeds, are highly active as fertilizers; others, as found in leather and peat, are comparatively slow in their effect on vegetation, unless these matters are chemically disintegrated.

Ammonia (NH_3) *and nitric acid* (N_2O_5) are results of the decay of *organic nitrogen* in the soil and manure heap, and contain Nitrogen in its most active forms. They occur in commerce—the former in sulphate of ammonia, the latter in nitrate of soda. 17 parts of ammonia or 66 parts of pure sulphate of ammonia contain 14 parts of nitrogen. 85 parts of pure nitrate of soda also contain 14 parts of nitrogen.

Phosphorus is, next to nitrogen, the most costly ingredient of Fertilizers, in which it always exists in the form of phosphates, usually those of calcium, iron and aluminum, or in case of some "super-phosphates," in the form of free phosphoric acid.

Soluble Phosphoric acid implies phosphoric acid or phosphates that are freely soluble in water. It is the characteristic ingredient of Superphosphates, in which it is produced, by acting on "insoluble" or "reverted" phosphates, with diluted sulphuric acid (oil of vitriol). Once well incorporated with the soil, it gradually becomes reverted phosphoric acid.

Reverted (reduced or precipitated) Phosphoric acid means strictly, phosphoric acid that was once easily soluble in water, but from chemical change has become insoluble in that liquid. In present usage the term signifies the phosphoric acid (of various phosphates) that is freely taken up by a strong solution of ammonium citrate, which is therefore used in analysis to determine its quantity. "Reverted phosphoric acid" implies phosphates that are readily assimilated by crops.

Recent investigation tends to show that soluble and reverted phosphoric acid are on the whole about equally valuable as plant food, and of nearly equal commercial value. In some cases, indeed, the soluble gives better results on crops, in others the reverted is superior. In most instances there is probably little to choose between them.

Insoluble Phosphoric acid implies various phosphates not soluble in water or ammonium citrate. In some cases the phosphoric acid is too insoluble to be readily available as plant-food. This is especially true

of the crystallized green Canada Apatite. Bone-black, bone-ash, South Carolina Rock and Navassa Phosphate when in coarse powder are commonly of little repute as fertilizers though good results are occasionally reported from their use. When *very finely pulverized* ("floats") they more often act well, especially in connection with abundance of decaying vegetable matters. The phosphate of calcium in raw bones is nearly insoluble, because of the animal matter of the bones, which envelops it; but when the latter decays in the soil, the phosphate remains in essentially the "reverted" form. The phosphoric acid of "Thomas-Slag" and of "Grand Cayman's Phosphate" is freely taken up by crops.

Phosphoric acid in all the Station analyses is reckoned as "anhydrous phosphoric acid" (P_2O_5) also termed among chemists, phosphoric anhydride, phosphoric oxide, and phosphorus pentoxide.

POTASSIUM is the constituent of Fertilizers, which ranks third in costliness. In plants, soils and fertilizers, it exists in the form of various salts, such as chloride (muriate), sulphate, carbonate, nitrate, silicate, etc. Potassium itself is scarcely known except as a chemical curiosity.

Potash signifies the substance known in chemistry as potassium oxide (K_2O), which is reckoned as the valuable fertilizing ingredient of "potashes" and "potash salts." In these it should be freely soluble in water and is most costly in the form of sulphate, and cheapest in the form of muriate (potassium chloride).

The Valuation of a Fertilizer, as practised at this station, consists in calculating the *retail Trade-value* or *cash-cost* (in raw material of good quality) of an amount of nitrogen, phosphoric acid and potash equal to that contained in one ton of the fertilizer.

Plaster, lime, stable manure and nearly all of the less expensive fertilizers have variable prices, which bear no close relation to their chemical composition, but guanos, superphosphates and similar articles, for which $30 to $50 per ton are paid, depend chiefly for their trade-value on the three substances, *nitrogen*, *phosphoric acid* and *potash*, which are comparatively costly and steady in price. The trade-value per pound of these ingredients is reckoned from the current market prices of the standard articles which furnish them to commerce.

The consumer, in estimating the reasonable price to pay for high-grade fertilizers, should add to the *Trade-value of the above named Ingredients*, a suitable margin for the expenses of manufacture, etc., and for the convenience or other advantage incidental to their use.

The average Trade-values or retail cost in market, per pound, of the ordinarily occurring forms of nitrogen, phosphoric acid and potash, as found in the New England, New York and New Jersey markets, are as follows :—

The Trade-Values for 1890 of Fertilizing Ingredients in Raw Materials and Chemicals.

The average Trade-Values or *retail cost per pound* of the ordinarily occurring forms of nitrogen, phosphoric acid and potash are as follows:

	Cts. per lb.
Nitrogen in ammonia salts	17
nitrates	14½
Organic nitrogen in dry and fine ground fish, meat and blood	17
in cotton seed meal and castor pomace	15
in fine bone and tankage	16½
in fine medium bone and tankage	13
in medium bone and tankage	10½
in coarser bone and tankage	8½
in hair, horn shavings and coarse fish scrap	8
Phosphoric acid, soluble in water	8
in ammonium citrate*	7½
in dry ground fish, fine bone and tankage	7
in fine medium bone and tankage	6
in medium bone and tankage	5
in coarser bone and tankage	4
in fine ground rock phosphate	2
Potash as high-grade Sulphate and in forms free from Muriate (or Chlorides)	6
as kainit	4½
as muriate	4½

These Trade-values were agreed upon by the Experiment stations of Massachusetts, New Jersey, and Connecticut, for use in their respective States during 1890. They are the average prices at which, during the six months preceding March last, the respective ingredients were retailed for cash, in our large markets, in those raw materials which are the regular source of supply. They also correspond to the average wholesale price for the six months ending March 1st, plus about 20 per cent. in case of goods for which we have wholesale quotations. The valuations obtained by use of the above figures will be found to correspond fairly with the *average retail prices* at the large markets of standard raw materials, such as:

Sulphate of Ammonia,	Muriate of Potash,
Nitrate of Soda,	Sulphate of Potash,
Dried blood,	Plain Superhosphate,
Azotin,	Dry Ground Fish,
Ammonite,	Bone and Tankage,

Ground So. Carolina Rock.

* Dissolved from 2 grams of the unground phosphate previously extracted with pure water, by 100 c. c. neutral solution of Ammonium Citrate, sp. gr. 1.09, in 30 minutes, at 65° C., with agitation once in five minutes. Commonly called "reverted" or "backgone" Phosphoric Acid.

Valuation of Superhosphates, Special Manures and Mixed Fertilizers of High Grade.

The organic nitrogen in these classes of goods is reckoned at the price of nitrogen in raw materials of the best quality.

Insoluble Phosphoric Acid is reckoned at 3 cents, unless found to be from rock phosphate. In this latter form Insoluble Phosphoric Acid costs but 2 cents per pound. Potash is rated at 4½ cents, if sufficient chlorine is present in the fertilizer to combine with it to make muriate. If there is more Potash present than will combine with the chlorine, then this excess of Potash is reckoned at 6 cents per pound.

In most cases the valuation of the Ingredients in Superhosphates and Specials falls below the retail price of these goods. The difference between the two figures represents the manufacturer's charges for converting raw materials into manufactured articles and selling them. These charges are for grinding and mixing, bagging or barreling, storage and transportation, commission to agents and dealers, long credits, interest on investments, bad debts, and finally, profits.

The majority of the manufacturers agree that the average cost of mixing, bagging, handling and cartage ranges from $3.00 to $4.50 per ton.

In 1890 the average selling price of Ammoniated Superphosphates, and Guanos was $33.80, the average valuation was $28.57, and the difference $5.23—an advance of 18.3 per cent. on the valuation and on the wholesale cost of the fertilizing elements in the raw materials.

In case of Special Manures the average cost was $39.18, the average valuation $32.90, and the difference $6.28, or 19.0 per cent. advance on the valuation.

To obtain the Valuation of a Fertilizer we multiply the pounds per ton of Nitrogen, etc., by the trade-value per pound. We thus get the values per ton of the several ingredients, and adding them together we obtain the total valuation per ton.

In case of *Ground Bone*, the sample is sifted into four grades and we separately compute the nitrogen-value of each grade by multiplying the pounds of nitrogen per ton, by the per cent. of each grade, taking $\frac{1}{100}$th of that product, multiplying it by the trade-value per pound of nitrogen in that grade, and taking this final product as the result in cents. Summing up the separate values of each grade, thus obtained, together with the values of each grade of phosphoric acid, similarly computed, the total is the Valuation of the sample of bone.

The uses of the "Valuation" are two-fold:

1. To show whether a given lot or brand of fertilizers is worth, as a commodity of trade, what it costs. If the selling price is not higher than the valuation, the purchaser may be tolerably sure that the price is reasonable. If the selling price is twenty to twenty-five per cent. higher than the valuation, it may still be a fair price; but in proportion as the cost per ton exceeds the valuation there is reason to doubt the economy of its purchase.

2. Comparisons of the valuation and selling prices of a number of similar fertilizers will generally indicate fairly which is the best for the money.

But the valuation is not to be too literally construed, for analysis cannot decide accurately what is the *form* of nitrogen, etc., while the mechanical condition of a fertilizer is an item whose influence cannot always be rightly expressed or appreciated.

For the above first-named purpose of valuation, the trade-values of the fertilizing elements which are employed in the computations should be as exact as possible, and should be frequently corrected to follow the changes of the market.

For the second-named use of valuation frequent changes of the trade-value are disadvantageous, because two fertilizers cannot be compared as to their relative money-worth, when their valuations are deduced from different data.

Experience leads to the conclusion that the trade-values adopted at at the beginning of a year should be adhered to as nearly as possibly throughout the year, notice being taken of considerable changes in the market, in order that due allowance may be made therefor.

The *Agricultural value* of a fertilizer is measured by the benefit received from its use, and depends upon its fertilizing effect, or crop-producing power. As a broad, general rule, it is true that Peruvian guano, superphosphates, fish-scraps, dried blood, potash salts, etc., have a high agricultural value which is related to their trade-value, and to a degree determines the latter value. But the rule has many exceptions, and in particular instances the trade-value cannot always be expected to fix or even to indicate the agricultural value. Fertilizing effect depends largely upon soil, crop and weather, and as these vary from place to place, and from year to year, it cannot be foretold or estimated except by the results of past experience, and then only in a general and probable manner.

CLASSIFICATION OF FERTILIZERS ANALYZED.

The fertilizers and manurial waste products analyzed at the Station laboratory from November 1st, 1889, to November 1st, 1890, were as follows :

RAW MATERIALS COMMONLY USED IN MIXED FERTILIZERS.

1. *Containing Nitrogen as the Chief Valuable Ingredient.*

Nitrate of Soda	2
Sulphate of Ammonia	1
Dried Blood	1
Cotton Seed Meal	7
Castor Pomace	5
Hoof Meal	1

2. *Containing Phosphoric Acid as the Chief Valuable Ingredient.*

Thomas-Slag	1
Precipitated Phosphate	1
Dissolved Bone Black	1
Rock Phosphate	13

3. *Containing Potash as the Chief Valuable Ingredient.*

Double Sulphate of Potash and Magnesia	2
Muriate of Potash	1
Kainit	1

4. *Containing Nitrogen and Phosphoric Acid.*

Bone Manures	28
Bone and Potash	1
Tankage	8

MIXED FERTILIZERS.

Nitrogenous Superphosphates and Guanos	105
Special Manures	45
Home-mixed Fertilizers	9

MISCELLANEOUS FERTILIZERS AND MANURES.

Cotton Hull Ashes	26
Unleached Wood Ashes	10
Lime-kiln Ashes	1
Limestone	2
Wool Waste	1
Tank Water and Settlings	3
Plaster	2
Yard Manure	2
Rockweed and Sponge	5
Total	314

These analyses are discussed in the order above given on the following pages.—In all cases where the contrary is not stated, the samples were drawn by agents of the Station. The regular retail prices are in all cases given. By special terms with the dealer in many cases the actual cash prices paid have been less than those here stated.

I. Raw Materials of High-Grade Containing Nitrogen as the Chief Valuable Ingredient.

Nitrate of Soda.

Nitrate of Soda is mined in Chili and purified there before shipment. It usually contains about 16 per cent. of nitrogen, equivalent to 97 per cent. of pure nitrate of soda. It contains besides, a little salt and some moisture. The usual guarantee is "96 per cent." of nitrate of soda equivalent to 15.8 per cent. of nitrogen.

2690. Sold by L. Sanderson, New Haven.

Analysis.

Water	1.86
Salt	.54
Sulphate of Soda	.22
Matters insoluble in water	.08
*Pure nitrate of soda	97.30
	100.00
* Containing nitrogen	16.06
Cost per ton	$50.00
Nitrogen costs per pound in cents	**15.6**

Sulphate of Ammonia.

This article, now made on a large scale as a by-product of gas-works, usually contains over 20 per cent. of nitrogen, the equivalent of from 94 to 97 per cent. of sulphate of ammonia. The rest is chiefly moisture. The usual guarantee is 25 per cent. of ammonia, which is equivalent to 20.6 per cent. of nitrogen, but commercial sulphate of ammonia commonly contains less than that quantity.

2691. Sold by L. Sanderson, New Haven.

ANALYSIS.

Nitrogen	20.86
Equivalent ammonia	25.3
Cost per ton	$75.00
Nitrogen costs per pound in cents	**18.**

DRIED BLOOD.

2721. A single sample of this material drawn from stock of L. Sanderson by a Station agent contained 12.90 per cent. of nitrogen. The price charged was $40.00 per ton.

Nitrogen costs per pound 15.5 cents.

COTTON SEED MEAL.

The seed of the cotton plant, after ginning to remove the fiber, passes through a mill which hulls or decorticates it. The hulled seed is ground and the oil expressed. The ground cake from the presses is used as a cattle food and fertilizer. The hulls are burned for fuel in the oil factory and the ashes, which contain from 20 to 30 per cent. of potash, are also used as a fertilizer.

Sometimes, however, hulls and seed are ground together, making "undecorticated meal" which contains considerably less nitrogen and has correspondingly less money value as a fertilizer or as a feed. When the meal has undergone heating or fermentation, its color changes from a deep yellow to brown or reddish brown. It is then unfit for cattle food and is sold at a cheaper rate as a fertilizer.

2658. "Off Color," unfit for cattle food. Stock of Olds & Whipple. Not sampled by Station agent.

2723. From stock of L. Sanderson, New Haven.

2758. "Off Color," from stock of C. L. Spencer, Suffield. Not sampled by Station agent.

2864. From stock bought by F. Culver, West Suffield. Sampled by F. C. Root.

2973. From stock bought and sampled by W. C. Newton, Durham, from Coles & Weeks, Middletown.

2980. From stock bought and sampled by Meech & Stoddard, Middletown. From Butler, Breed & Co. of Boston. This sample is undecorticated, which explains the low per cent. of nitrogen. It will be referred to more particularly in the discussion of feeding stuffs.

ANALYSES.

	2658	2723	2758	2864	2973	2980
Nitrogen	6.44	6.89	6.74	7.42	5.63	3.67
Phosphoric Acid	3.34	3.12	3.22	3.10	3.27	1.60
Potash	1.96	2.22	2.16	1.62	1.80	1.45
Cost per ton	$22.00	$26.00	$23.00	$25.00	$27.00	....
Nitrogen costs per pound in cents,*	11.7	13.8	11.9	12.6	18.0	...

* Allowing 7c. and 6c. per pound respectively for phosphoric acid and potash.

Special attention is called to the last two analyses.

2973 is adulterated with rice meal which is harmless but reduces the value of the meal, either as a feed or fertilizer, by four or five dollars a ton. The color of the meal is rather lighter than pure meal, but the adulteration is not likely to be detected without microscopic or chemical examination.

Messrs. Coles & Weeks, from whom it was bought, state that they purchased it through a New York agent, and as a long time elapsed between the purchase and the sending to the Station for analysis the manufacturer of the fraud could not be traced. Messrs. Coles & Weeks expressed surprise at the result, as they had always ordered the best, and offered to make good the loss to the purchaser. Samples which are to be sent to the Station for analysis should be sent *at once.*

Cotton seed meal, of good quality, such as is used for cattle food, is one of the cheapest sources of available nitrogen in our fertilizer market, and that which is "off color" supplies nitrogen at even lower prices ; in Nos. **2658** and **2758** for less than 12 cents per pound.

CASTOR POMACE.

The ground residue of castor beans from which castor oil has been extracted.

2714. Made by Occidental Oil Co., N. Y. Sold by L. Sanderson, New Haven. Sampled by E. F. Thompson, Warehouse Point.

2655. Made by Occidental Oil Co., N. Y. Sold by L. Sanderson, New Haven. Sampled by John Mason at Warehouse Point.

2656. Made by Collier Lead & Oil Co., St. Louis. Sold by F. Ellsworth, Hartford.

2932. Made by H. J. Baker & Bro., N. Y. Sold by W. F. Andross, East Hartford.

2933. Made by Red Seal Castor Oil Co., St. Louis, Mo. Sold by Olds & Whipple, Hartford.

ANALYSES.

	2714	2655	2656	2932	2933
Nitrogen	4.70	4.93	5.65	5.08	5.47
Phosphoric acid	1.55	1.62	2.11	1.83	2.41
Potash	1.24	1.11	1.05	1.11	1.16
Cost per ton	$19.00	$19.00	$23.00	$21.00	$23.00
Nitrogen costs per pound in cents,*	16.3	15.6	16.6	16.8	16.7

*Allowing 7c. and 6c. per pound respectively for phosphoric acid and potash.

The Castor Pomace furnished by the Occidental Oil Co. is exceptionally low in nitrogen [4.70–4.93 per cent.], but at $19.00 per ton, nitrogen costs no more than in the other brands sold at $23.00 per ton.

HOOF MEAL.

2805. A sample of this material, purchased in Chicago for field experiments, contained 13.90 per cent. of nitrogen.

II. RAW MATERIALS OF HIGH GRADE CONTAINING PHOSPHORIC ACID.

THOMAS-SLAG.

2730. Purchased by Lawrence Doyle, Harwinton, from P. Weidinger, 76 Pine St., N. Y., for $16.00 per ton, f. o. b. N. Y. Sampled by Mr. Doyle. The Slag contained 19.76 per cent. of phosphoric acid.

The phosphoric acid therefore costs 4 cents per pound.

DISSOLVED BONE BLACK.

A superphosphate prepared by treating bone black with oil of vitriol which renders nearly all of the phosphoric acid soluble in water.

2688. A single sample from stock of L. Sanderson, New Haven, had the following composition :—

ANALYSIS.

Soluble phosphoric acid	16.99
Reverted "	.13
Insoluble "	None
Cost per ton	$26.00
Available phosphoric acid costs per pound in cents	7.6

Precipitated Phosphate.

2669. Made by the Cartaret Chemical Co., 115 Broadway, N. Y. Sampled and sent by the manufacturers.

Analysis.

Soluble phosphoric acid	2.32
Reverted	28.52
Insoluble	6.53
Cost per ton	$33.63*
Available phosphoric acid costs per pound in cents	5.4

* Wholesale.

This waste product from the glue manufacture is a white powder, fine and dry, and contains a large per cent. of phosphoric acid which has been precipitated from solution by the addition of lime. It is sold on analysis, wholesale, at "90 cents per unit of phosphoric acid." A "unit" in the trade is 1 per cent. or 20 pounds per ton. As the sample contains 37.37 per cent. or "units" of phosphoric acid, the ton price would be 37.37×.90= $33.63 at Newark, N. J., f. o. b.

Precipitated phosphate of lime is readily assimilable by vegetation and in many cases has proved quite as efficient as water-soluble phosphates and is considerably cheaper.

III. Raw Materials of High Grade Containing Potash.

Double Sulphate of Potash and Magnesia and Muriate of Potash.

The first named material is usually sold as "sulphate of potash" or "manure salt," on a guarantee of "48–50 per cent. sulphate," which is equivalent to 25.9–27 per cent. of actual potash. Besides some 46–50 per cent. of sulphate of potash it contains over 30 per cent. of sulphate of magnesia, chlorine equivalent to 3 per cent. of common salt, a little sulphate of soda and lime, with varying quantities of moisture.

Commercial muriate of potash contains about 80 per cent. of muriate of potash (potassium chloride), 15 per cent. or more of common salt (sodium chloride), and 4 per cent. or more of water.

It is generally retailed on a guarantee of 80 per cent. muriate, which is equivalent to 50.5 per cent. of actual potash.

2687. Sulphate of Potash. **2689.** Muriate of Potash; both from stock of L. Sanderson, sampled by Station agent.

ANALYSES.

Potash	25.76	51.12
Cost per ton	$30.00	$42.50
Potash costs per pound in cents	5.8	4.2

IV. RAW MATERIALS CONTAINING NITROGEN AND PHOSPHORIC ACID.

BONE MANURES.

The terms "Bone Dust," "Ground Bone," "Bone Meal" and "Bone" applied to fertilizers, sometimes signify material made from dry, clean and pure bones; in other cases these terms refer to the result of crushing fresh or moist bones which have been thrown out either raw or after cooking, with more or less meat, tendon, and grease—and if taken from garbage heaps, with ashes or soil adhering; again they denote mixtures of bone, blood, meat and other slaughter-house refuse which have been cooked in steam-tanks in order to recover grease, and are then dried and sometimes sold as "tankage;" or, finally, they apply to bone from which a large share of the nitrogen has been extracted in the glue manufacture. The nitrogen of all these varieties of bone when they are in the same state of mechanical subdivision has essentially the same fertilizing value.

1. *Sampled by Station Agents.*

On pages 29 to 31 will be found tabulated analyses belonging to this class. Excluding **2934** and **2931,** which are mixtures of bone and potash, and **2928,** which is a mixture of bone and salt cake, the average cost of the other 19 samples of bone has been $33.00 and the average valuation $37.77. The values used by the Station in the valuation of bone this year have been, therefore, too high by about 10 per cent.

Bone Manures.—Sampled by the Station.

Station No.	Name or Brand.	Manufacturer.	Dealer.	Cost per ton.
2720	Pure Ground Bone.	----------	L. Sanderson, New Haven.	$33.00
2924	Pure Bone Meal.	Peter Cooper's Glue Factory, N. Y.	Wilson & Burr, Middletown.	28.00
2811	Bone Fertilizer.	Plumb & Winton, Bridgeport, Conn.	Manufacturers.	30.00
2934	Self-Recommending Fertilizer.	F. Nuhn, Waterbury, Conn.	City Coal & Wood Co., New Britain.	33.00
2962	Pure Ground Bone.	Peck Bros., Northfield, Conn.	Manufacturers.	28.00
3004	Swift Sure Bone Meal.	M. L. Shoemaker & Co., Philadelphia, Pa.	F. Ellsworth, Hartford.	40.00
			J. P. Barstow & Co., Norwich.	38.00
			F. S. Bidwell, Windsor Locks.	32.00
2681	Pure Ground AX Bone.	Rogers & Hubbard Co., Middletown.	Manufacturer.	32.00
2683	Raw Knuckle Bone Flour.	Rogers & Hubbard Co., Middletown.	Manufacturer.	37.00
2918	Ground Bone.	Quinnipiac Co., New London.	J. F. Ellwood, Southport.	31.00
			G. M. Williams, New London.	35.00
			A. P. Wakeman, Fairfield.	----
2682	Strictly Pure Fine Bone.	Rogers & Hubbard Co., Middletown.	Manufacturer.	34.00
2926	Ground Bone.	L. B. Darling Fertilizer Co., Pawtucket, R. I.	Olds & Whipple, Hartford.	35.00
			J. A. Lewis, Willimantic.	34.00
			J. P. Barstow & Co., Norwich.	34.00
2921	Fine Ground Bone.	H. J. Baker & Bro., 215 Pearl St, N. Y.	C. O. Jelliff & Co., Southport.	31.00
2927	Ground Bone.	Downs & Griffin, Birmingham.	Manufacturer.	30.00
2917	Chittenden's Ground Bone.	National Fertilizer Co., Bridgeport.	D. H. Leonard, Leonard's Bridge.	----
			T. E. Eldridge, Norwich.	33.00
			E. P. Matherson, Pomfret.	33.00
			J. H. French, Cheshire.	34.00

BONE MANURES.—SAMPLED BY THE STATION—*Continued.*

Station No.	Name or Brand.	Manufacturer.	Dealer.	Cost per ton.
2923	Pure Fine Ground Bone.	Bradley Fertilizer Co., 27 Kilby St, Boston, Mass.	Waterbury & June, Greenwich.	----
			W. B. Martin, Rockville.	$35.00
			R. A. Parker, Warehouse Point.	36.00
			Burtis & Mead, New Canaan.	37.00
			G. Dickinson, Haddam.	35.00
2923	Pure Ground Bone.	G. W. Miller, Middlefield, Conn.	W. H. Cheney's Sons, So. Manchester.	35.00
			Manufacturer.	30.00
2920	Ground Bone.	H. S. Miller & Co., Newark, N. J.	Southington Lumber & Feed Co., Southington.	30.00
			J. P. Bolan, Waterbury.	34.00
			Staples & Raymond, Westport.	35.00
			H. K. Brainard, Thompsonville.	28.00
2930	Pure Ground Bone.	Williams & Clark Fertilizer Co., N. Y.	Daniel Morgan, Poquonock.	35.00
			W. E. Payne, Rockville.	35.00
2931	Ground Bone.	E. Frank Coe., 16 Burling Slip, N. Y.	Arnold Rudd, New London.	30.00
			Simon Banks, Southport.	28.00
2925	Pure Ground Bone.	Crocker Fertilizer Co., Buffalo, N. Y.	J. S. Wells, Hebron.	38.00
2922	Fresh Ground Bone.	Bowker Fertilizer Co., 43 Chatham St., Boston, Mass.	Hull & Sweet, South Coventry.	35.00
			H. F. Porter, Hebron.	34.00
			J. A. Lewis, Willimantic.	34.00
2928	Lister's Celebrated Ground Bone.	Lister's Agricultural Chemical Works, Newark, N. J.	A. N. Clark, Milford.	28.00

Analyses of Bone Manures.—Sampled by the Station.

Station No.	Name or Brand.	Chemical Analysis.		Mechanical Analysis.					Cost per ton.	Valuation per ton.	Percentage difference between cost and valuation.
				Finer than				Coarser than			
		Nitrogen.	Phos. Acid.	1/50 inch.	1/25 inch.	1/12 inch.	1/6 inch.	1/6 inch.			
											Valuation exc'ds cost.
2720	Sanderson's Pure Ground Bone	3.61	25.38	74	23	3	--	--	$33.00	$45.26	27.1
2924	Peter Cooper's Bone Dust	2.01	28.07	41	15	22	22	--	28.00	37.47	25.3
2811	Plumb & Winton's Bone Fertilizer	4.37	20.61	53	22	17	8	--	30.00	37.86	20.8
2934	Nuhn's Self-Recommending Fertilizer	3.99	*22 09	65	20	9	6	--	32.50	40.76	20.2
2962	Peck Bros.' Pure Ground Bone	4.13	21.15	30	27	28	15	--	28.00	34.67	19.2
3004	Shoemaker's Swift Sure Bone Meal	6.00	21.95	63	28	9	--	--	40.00	49.33	18.9
2681	Rogers & Hubbard Co's Pure Ground AX Bone	4.08	22.52	45	24	28	3	--	32.00	38.73	17.4
2683	Rogers & Hubbard Co's Raw Knuckle Bone Flour	3.85	25.45	72	28	--	--	-	37.00	44.60	17.0
2918	Quinnipiac Ground Bone	3.16	24.51	53	22	20	5	--	33.00	39.47	16.4
2682	Rogers & Hubbard Co's Strictly Pure Fine Bone	4.00	22.93	52	29	19	--	--	34.00	40.51	16.0
2926	Darling's Ground Bone	2.69	24.26	71	19	10	--	--	34.00	40.27	15.5
2921	Baker's Fine Ground Bone	3.81	24.27	48	34	18	--	--	31.00	36.57	15.2
2927	Downs & Griffin's Ground Bone	4.51	23.05	17	20	44	19	--	30.00	35.15	14.6
2917	Chittenden's Ground Bone	3.08	25.13	44	20	20	16	--	33.00	37.96	13.1
2923	Bradley's Pure Fine Ground Bone	3.62	22.81	58	30	12	--	--	35.00	40.13	12.8
2929	G. W. Miller's Pure Ground Bone	4.07	22.53	18	16	27	39	--	30.00	32.24	6.9
2920	H. S. Miller's Ground Bone	2.29	22.73	49	18	22	11	--	32.00	33.77	5.2
2930	Williams & Clark's Pure Bone Meal	2.83	23.95	42	23	23	12	--	35.00	36.06	2.9
											Cost exc'ds valuation.
2931	E. Frank Coe's Ground Bone	2.08	†18.75	35	20	21	24	--	29.00	27.67	1.2
2925	Crocker's Pure Ground Bone	4.37	23.69	23	25	34	18	--	38.00	36.82	3.2
2922	Bowker's Fresh Ground Bone	3.02	20.12	31	26	32	11	--	34.00	30.95	9.8
2928	Lister's Ground Bone	2.90	14.34	43	20	19	18	--	28.00	24.53	14.1

* Also contains .64 per cent. of Potash and .90 per cent. of Chlorine.

† Also contains 1.33 per cent. of Potash.

2. *Manufacturers' Samples and Samples Sent by Purchasers.*

3002. Ground Bone, made by E. B. Fall, Middletown.

2642. Ground Bone, made by F. Nuhn, Waterbury. Sampled and sent by John Spear, Cheshire.

2741. Self-Recommending Fertilizer, made by F. Nuhn, Waterbury. Sampled and sent by E. Davis, Hamden.

3054. Bone Sawdust, made by Salisbury Cutlery Co. Sampled and sent by T. A. Stanley, New Britain. Cost $40.00 per ton f. o. b. in Springfield, Mass.

ANALYSES.

	3002.	2642.	2741.	3054.
Fine, smaller than $\frac{1}{60}$ inch	52	59	68	100
Fine medium, smaller than $\frac{1}{26}$ inch	25	20	14	0
Medium, smaller than $\frac{1}{12}$ inch	20	16	10	0
Coarse, larger than $\frac{1}{12}$ inch	3	5	8	0
	100	100	100	100
Nitrogen	1.85	3.96	3.77	3.96
Phosphoric Acid	28.53	21.26	19.84	26.29
Potash	---	---	3.93	---
Valuation per ton	$40.97	$38.33	$40.14	$49.88

2675. Bone and Potash, home mixed. Sampled and sent by C. Buckingham, Southport.

2751. Bone ground at a grist mill and sent for analysis by E. M. Spalding, Suffield.

3055. Fish Scrap and Potash Salts, made by G. W. Miles, Milford. Sampled and sent by W. L. and S. T. Merwin, Milford.

	2675.	2751.	3055.
Nitrogen	3.23	3.31	4.32
Phosphoric Acid	13.19	17.45	3.64
Potash	6.86	----	2.53
Cost per ton	$35.00	$30.00	$20.00
Valuation	$34.34	$27.17	$22.06

84 per cent. of the mixture **2675** passed a $\frac{1}{25}$ inch sieve. Only 14 per cent. of **2751** passed a $\frac{1}{25}$ inch sieve and a half of it was larger than $\frac{1}{12}$ inch.

Tankage.

This name is properly applied only to the sediment remaining in tanks where meat scrap with some bone is rendered to separate the fat. After boiling or superheating with steam, the fat rises to the surface of the water and is removed, the soup is run off, and the settlings at the bottom are dried and sold as tankage. Such material contains as large or larger percentage of nitrogen than of phosphoric acid. But the name tankage is also loosely applied to mixtures that consist largely of bone and do not differ greatly in composition from pure bone.

2686. Pulverized Tankage [Bone and Meat]; **2722,** Tankage; **2749,** Blood, Bone and Meat. All from stock of L. Sanderson, New Haven.

2750. Blood, Bone and Meat, made by F. S. Andrew & Co., New Haven. Sampled and sent by M. Wooding, Highwood.

2972. Tankage, made by Strong, Barnes, Hart & Co., New Haven. Sampled and sent by W. C. Newton, Durham.

Mechanical Analyses.

	2686	2722	2749	2750	2972
Fine, smaller than $\frac{1}{60}$ inch	96	42	51	19	47
Fine medium, smaller than $\frac{1}{20}$ inch	4	22	18	17	21
Medium, smaller than $\frac{1}{12}$ inch	--	25	19	26	14
Coarse, larger than $\frac{1}{12}$ inch	--	11	12	38	18
	100	100	100	100	100

Chemical Analyses.

	2686	2722	2749	2750	2972
Nitrogen	5.03	8.26	7.35	4.00	6.96
Phosphoric Acid	19.32	8.75	12.69	17.09	9.94
Cost per ton	$35.00	$35.00	$35.00	$20.00	$22.00*
Valuation per ton	43.36	32.46	35.67	24.87	32.03

*In 5 ton lots f. o. b., New Haven.

Mixed Fertilizers.

I. Nitrogenous Superphosphates and Guanos.

Here are included those mixed fertilizers containing nitrogen, phosphoric acid and in most cases potash, which are not designed by their manufacturers for use on any special crop. "Special Manures" are noticed further on. Fish scrap is here included as it is sometimes acidulated with oil of vitriol to preserve it, thus making it a nitrogenous superphosphate.

1. *Samples drawn by Station Agents.*

In the tables on pages 37 to 47 are given sixty-five analyses of this kind.

After the name of a brand the names of a number of dealers are frequently given. This indicates that a sample of this brand was drawn by our agent from each dealer named and that the corresponding analysis was made on a mixture of equal parts of all these samples.

The Station assumes full responsibility for accuracy of sampling and analysis only on such samples as are drawn by its own agents. On samples drawn by other persons the Station holds itself responsible only for the accuracy of analysis, but requires before making an analysis a formal statement that the person who drew the sample did it in accordance with the Station directions. A blank form of this statement is furnished on application.

The prices quoted are dealers' *cash ton* prices.

These prices quoted by different dealers for the same fertilizers differ in some cases considerably, partly on account of difference in freight-rates, presence or absence of competition, etc. Some manufacturers claim that their goods are sold at a uniform price at all points in the state, but usually the price charged is fixed by the dealer.

The last column of the table of analyses is "Percentage Difference between Cost and Valuation." Its significance and the method of calculating it may be seen by noticing the first analysis in the table on page 45, No. **2795**. Here the cost is $36,

the valuation is $32.02, and the difference between them is $3.98. By multiplying this difference, $3.98, by 100, and dividing it by the valuation, $32.02, we get 12.4. the percentage advance of selling price over valuation, which advance should represent on the average the costs and profits of the manufacturer in converting the raw materials into a mixed fertilizer, selling it and collecting on his sales.

DIFFERENCE BETWEEN COST AND VALUATION.

In five cases the valuation exceeded the cost.

Leaving out of account the last three analyses in the tables in which the cost exceeded valuation by considerably more than 50 per cent. the average cost of 62 Nitrogenous Superphosphates was $33.80 and the average valuation $28.57. The difference is $5.23, and the percentage difference 18.3.

That is, the same quantities of nitrogen, phosphoric acid and potash, which were contained in an average ton of Nitrogenous Superphosphate could have been bought in raw materials of standard quality in ton lots in this State for $28.57 cash, in the average Superphosphate they cost $33.80, and hence the manufacturers' and dealers' expenses and profits on a ton of fertilizer averaged $5.23, or 18.3 per cent. of the cost of the materials.

Guarantees.—The analyses of 23 superphosphates out of the 65 show that their composition is below the maker's minimum guarantee in one or more particulars. Twenty-two, or more than one-third of the whole number, are deficient in one ingredient, and two others in two ingredients.

It is required, under the law, that the quantity of *actual* potash shall be expressly stated. "Potash, Sulphate, 4 per cent." means four per cent of *actual potash* in the form of sulphate, and not 2.16 per cent. of potash, but the expression is often used by manufacturers, when only the smaller quantity of actual potash is present in the fertilizer. Such use is deceptive.

Fish and Potash.—The analyses of material bearing this designation, though included among nitrogenous superphosphates are also tabulated by themselves on the next page. Most of the brands are not simple mixtures of fish scrap and potash salts, as the name would imply, but contain in some cases considerable quantities of added phosphates.

Fish and Potash—Sampled by the Station.

	Kelsey's.	Bowker's.	Chittenden's.	Quinnipiac Plain Brand.	Bradley's Anchor Brand.	Read's.	Church's.	Quinnipiac Crossed Fishes Brand.	Bradley's Triangle A.	Farmer's.	E. F. Coe's.
	2828	**2839**	**2793**	**2876**	**2852**	**2892**	**2907**	**2875**	**2851**	**2831**	**2856**
Nitrogen as Ammonia	.78	----	.96	.56	----	----	.30	.78	.62	----	----
Nitrogen, Organic	3.24	2.54	2.92	2.25	3.76	2.78	2.96	3.02	2.00	1.69	2.21
Soluble Phosphoric Acid	2.56	5.95	1.31	1.60	4.76	3.52	1.55	1.12	3.25	4.26	.51
Reverted Phosphoric Acid	3.16	1.99	4.37	3.31	1.84	2.46	2.71	3.79	1.60	2.33	3.75
Insoluble Phosphoric Acid	.68	4.42	3.10	3.00	1.36	1.73	.88	3.57	1.35	1.25	4.60
Potash	3.51	4.15	5.05	5.22	2.67	4.96	3.89	4.41	3.99	7.42	3.10
Cost	$27.00	32.50	33.00	28.00	32.00	30.00	28 00	34.00	30.00	34.00	29.50
Valuation	$26.65	28.68	28.26	23.59	26.39	24.28	21.67	26.51	20.91	23.50	19.56

Nitrogenous Superphospates and Guanos Sampled by the Station.

Station No.	Name or Brand.	Manufacturer.	Dealer.	Dealers' cash price per ton.
2909	Dry Ground Fish Guano.	Leander Wilcox, Mystic Bridge.	C. M. Smith, E. Hartford.	------
2879	Acidulated Fish Guano.	Leander Wilcox, Mystic Bridge.	C. M. Smith, E. Hartford.	$22.00
2919	Dry Ground Fish.	Quinnipiac Co., New London.	Olds & Whipple, Hartford.	36.00
2908	Pure Dry Fish.	Joseph Church & Co., Tiverton, R. I.	H. K. Brainard, Thompsonville.	36.00
2748	Sanderson's Formula, A. A.	L. Sanderson, New Haven.	J. J. Merwin, Orange.	36.00
2891	Flour of Bone Phosphate.	G. W. Miller, Middlefield.	Manufacturer.	35.00
2828	Fish and Potash.	E. R. Kelsey, Branford.	Wilson & Burr, Middletown.	28.00
			Miles Payne, Cheshire.	25.00
2880	Swift Sure Superphosphate.	M. L. Shoemaker & Co., Phila., Pa.	J. P. Barstow & Co., Norwich.	37.00
			F. Ellsworth, Hartford.	38.00
2857	Ammoniated Bone Superphosphate.	Russell Coe, Tremley, N. J.	City Coal and Wood Co., New Britain.	30.00
			Wilson & Burr, Middletown.	30.00
			S. J. Hall, Meriden.	32.00
2904	Harvest Queen Phosphate.	H. S. Miller & Co., Newark, N. J.	J. O. Fox, Putnam.	25.00
			H. K. Brainard, Thompsonville.	28.00
2874	Market Garden Manure.	Quinnipiac Co., New London.	E. B. Clark, Milford.	39.00
			J. F. Elwood, Southport.	41.00
2802	Standard or Success Fertilizer.	Lister's Agricultural Chemical Works, Newark, N. J.	J. A. Lewis, Willimantic.	28.00
			A. N. Clark, Milford.	25.00
			J. H. Fish, Newington.	30.00
2823	Ammoniated Bone Phosphate.	Lister's Agricultural Chemical Works, Newark, N. J.	Edw. Carroll, E. Hartford.	37.00
			A. N. Clark, Milford.	28.00
			G. T. Fowler, Branford.	28.00
2873	Cumberland Superphosphate.	Cumberland Bone Co., Portland, Me.	Haley & Cheseboro, Stonington.	35.00
			H. H. Davenport, Putnam.	34.00
2761	Pine Island Phosphate.	Quinnipiac Co., New London.	J. E. Leonard, Jewett City.	32.00
			John Taylor, Old Mystic.	37.00
			Olds & Whipple, Hartford.	35.00
			B. E. Johnson, Higganum.	32.00
			E. B. Clark, Milford.	30.00

NITROGENOUS SUPERPHOSPHATES AND GUANOS SAMPLED BY THE STATION—*Continued.*

Station No.	Name or Brand.	Manufacturer.	Dealer.	Dealers' cash price per ton.
2795	Complete Manure, A Brand.	Mapes' Formula and Peruvian Guano Co., N. Y.	Mapes' Branch, Hartford.	$36.00
			Wilson & Burr, Middletown.	36.00
			J. P. Barstow & Co., Norwich.	36.00
2839	Fish and Potash.	Bowker Fertilizer Co., 43 Chatham Street, Boston, Mass.	F. Hallock & Co., Birmingham.	35.00
2765	A. A. Ammoniated Bone Superphosphate.	H. J. Baker & Bro., 215 Pearl St., N. Y.	W. W. Cooper, Suffield.	37.50
			A. L. Winton, Bridgeport.	37.50
			M. F. Gregory & Co., Milford.	38.00
			W. F. Andross, E. Hartford.	37.50
2797	Complete Manure for General Use.	Mapes' Formula and Peruvian Guano Co., N. Y.	Mapes' Branch, Hartford.	39.00
			W. H. Childs, Manchester.	39.00
			Dean & Horton, Stamford.	40.00
2766	Ammoniated Bone Phosphate.	National Fertilizer Co., Bridgeport.	N. C. Barker, Lebanon.	33.00
			G. H. & H. B. Williams, E. Hartford.	32.00
			T. E. Eldridge, Norwich.	------
			S. W. Currier, Bridgeport.	35.00
			E. B. Clark, Milford.	30.00
2822	Farmers' New Method Fertilizer.	Bradley Fertilizer Co., 27 Kilby St., Boston, Mass.	Warren, Clark & Taylor, Sandy Hook.	32.00
			J. E. Leonard, Jewett City.	32.00
			Prentiss & Young. Norwich.	32.00
			D. N. Clark & Sons, Milford.	30.00
			W. J. Starr, Groton.	34.00
			G. R. Fowler, Central Village.	34.00
			F. S. Bidwell, Windsor Locks.	30.00
			Carter & Strong, Manchester.	34.00
			Wilson & Burr, Middletown.	34.00
			G. W. Carver, Putnam.	29.00

NITROGENOUS SUPERPHOSPHATES AND GUANOS SAMPLED BY THE STATION—*Continued.*

Station No.	Name or Brand.	Manufacturer.	Dealer.	Dealers' cash price per ton.
2860	Darling's Animal Fertilizer.	L. B. Darling Fertilizer Co., Pawtucket, R. I.	R. P. Hubbard, Middletown.	$36.00
			F. S. Bidwell, Windsor Locks.	35.00
			J. P. Barstow & Co , Norwich.	35.00
2798	Complete Manure for Light Soils.	Mapes' Formula and Peruvian Guano Co., N. Y.	Mapes' Branch, Hartford.	44.00
			G. K. Nason, Willimantic.	45.00
			Wilson & Burr, Middletown.	44.00
2762	Ammoniated Bone Superphosphate, Americus Brand.	Williams & Clark Fertilizer Co., 81 Fulton St., N. Y.	Dix & Wells, Wethersfield.	35.00
			Daniel Morgan, Poquonock.	35.00
			J. E. Roode, Jewett City.	36.00
			C. L. Backus, Andover.	----
			Charles Stagg, Stratford.	35.00
			L. N. Dimmock, New London.	35.00
			Abbott & Co., Birmingham.	40.00
			F. S. Bidwell, Windsor Locks.	34.00
			H. K. Brainard, Thompsonville.	35.00
			J. P. Little, Columbia.	36.00
2793	Chittenden's Fish and Potash.	National Fertilizer Co., Bridgeport.	G. H. & H. B. Williams, E. Hartford.	32.00
			N. C. Barker, Lebanon.	33.00
			T. E. Eldridge, Norwich.	34.00
2876	Fish and Potash, Plain Brand.	Quinnipiac Co., New London.	A. J. Martin, Wallingford.	28.00
			B. E. Johnson, Higganum.	31.00
2760	Quinnipiac Phosphate.	Quinnipiac Co., New London.	J. P. Little, Columbia.	36.00
			G. M. Williams, New London.	37.00
			D. C. Wood, Stratford.	37.00
			J. S. Worthington, Portland.	36.00
			Olds & Whipple, Hartford.	38.00

NITROGENOUS SUPERPHOSPHATES AND GUANOS SAMPLED BY THE STATION—*Continued.*

Station No.	Name or Brand.	Manufacturer.	Dealer.	Dealers' cash price per ton.
2815	Ammoniated Bone Phosphate.	Bowker Fertilizer Co., 43 Chatham St., Boston, Mass.	J. E. Leonard, Jewett City.	$32.00
			N. E. Smith, Woodmont.	30.00
			E. B. Clark, Milford.	30.00
			W. B. Martin, Rockville.	34.00
2976	Standard Bone Superphosphate.	H. S. Miller & Co., Newark, N. J.	Staples & Raymond, Westport.	35.00
			Southington L. & F. Co., Southington.	34.00
			A. Williams, Collinsville.	35.00
2841	Sea Fowl Guano.	Bradley Fertilizer Co., 27 Kilby St., Boston, Mass.	W. W. Cooper, Suffield.	36.00
			F. S. Bidwell, Windsor Locks.	32.00
2882	Royal Bone Phosphate.	Williams & Clark Fertilizer Co., 81 Fulton St., N. Y.	Hale, Day & Co., South Manchester.	28.00
			F. S. Bidwell, Windsor Locks.	30.00
2852	Fish and Potash, Anchor Brand.	Bradley Fertilizer Co., 27 Kilby St., Boston, Mass.	H. J. Morse, Cheshire,	32.00
			R. A. Parker, Warehouse Point.	32.00
2820	Bradley's Patent Superphosphate of Lime.	Bradley Fertilizer Co., 27 Kilby St., Boston, Mass.	N. C. Barker, Lebanon.	36.00
			W. J. Starr, Groton.	37.00
			D. Beers, Danbury.	38.00
			J. E. Leonard, Jewett City.	36.00
			Burtis & Mead, New Canaan.	38.00
			D. N. Clark & Sons, Milford.	34.00
			E. B. Clark, Woodmont.	37.00
			Warren, Clark & Taylor, Sandy Hook.	36.00
			E. E. Scofield, Stamford.	34.00
			J. E. Holmes, Stratford.	37.00
			Wheeler & Howe, Bridgeport.	37.00
			Raymond Bros., South Norwalk.	36.00
			Prentiss & Young, Norwich.	36.00
			G. A. Dickinson, Haddam.	36.00
			G. R. Fowler, Central Village.	----
			Carter & Strong, Manchester.	38.00
			Dix & Wells, Wethersfield.	35.00
			Wilson & Burr, Middletown.	35.00
			J. P. Little, Columbia.	36.00

NITROGENOUS SUPERPHOSPHATES AND GUANOS SAMPLED BY THE STATION—*Continued.*

Station No.	Name or Brand.	Manufacturer.	Dealer.	Dealers' cash price per ton.
2820	Bradley's Patent Superphosphate of Lime.	Bradley Fertilizer Co., 27 Kilby St., Boston, Mass.	J. A. Lewis, Willimantic.	$38.00
			R. A. Parker, Warehouse Point.	34.00
			Quinnebaug Store, Danielsonville.	36.00
			W. B. Martin, Rockville.	36.00
			W. H. Cheney's Sons, S. Manchester.	38.00
			W. F. Andross, East Hartford.	36.00
			A. C. Sternberg, Hartford.	35.00
			G. W. Carver, Putnam.	35.00
			H. D. Lanphear, Chaplin.	36.00
			F. S. Bidwell, Windsor Locks.	34.00
2768	High Grade Phosphate.	E. Frank Coe, 16 Burling Slip, N. Y.	N. C. Barker, Lebanon.	34.00
			I. W. Denison & Co., Mystic.	33.00
			Wheeler & Howe, Bridgeport.	35.00
			Backus Bros., South Windham.	34.00
			F. P. Burr & Co., Middletown.	35.00
			Arnold Rudd, New London.	33.00
			J. P. Barstow & Co., Norwich.	32.00
			J. A. Amidon, Wethersfield.	33.00
2800	Chittenden's Complete Fertilizer.	National Fertilizer Co., Bridgeport.	G. H. & H. B. Williams, E. Hartford.	42.00
			D. Fitzgerald, Stratford.	42.00
			D. G. Penfield, Danbury.	42.50
2833	Reese's New England Favorite.	J. S. Reese & Co., New Bedford, Mass.	Ansell Arnold & Co., Willimantic.	29.00
2813	Clark's Cove Bay State Fertilizer, G. G.	J. S. Reese & Co., Licensee, New Bedford, Mass.	Ansell Arnold & Co., Willimantic.	28.50
			H. H. Davenport, Pomfret.	32.00
			W. Tillinghast, Plainfield.	37.50
2889	Victor Phosphate.	Apothecaries Hall Co., Waterbury.	Manufacturer.	30.00
2892	Bone, Fish and Potash.	Read Fertilizer Co., N. Y.	W. F. Andross, East Hartford.	30.00
			H. E. Ives, Cheshire.	30.00

NITROGENOUS SUPERPHOSPHATES AND GUANOS SAMPLED BY THE STATION—*Continued.*

Station No.	Name or Brand.	Manufacturer.	Dealer.	Dealers' cash price per ton.
2803	Hill and Drill Phosphate.	Bowker Fertilizer Co., 43 Chatham St., Boston, Mass.	Hull & Sweet, South Coventry.	$38.00
			C. H. Bell, Portland.	38.00
			J. H. Ives, Danbury.	38.00
			C. T. Leonard, Norwalk.	38.00
			B. Curtis & Son, Stepney.	40.00
			W. B. Martin, Rockville.	37.00
			J. H. Fish, Newington.	36.00
2905	Olds & Whipple's Special Phosphate.	Made for Dealer.	Olds & Whipple, Hartford.	35.00
2910	IXL Phosphate.	G. W. Miles, Milford.	A. H. Hinckley, Old Mystic.	30.00
2843	Original Coe's Superphosphate.	Bradley Fertilizer Co., 27 Kilby St., Boston, Mass.	F. S. Bidwell, Windsor Locks.	33.00
2835	Soluble Pacific Guano.	W. D. Stewart & Co., Boston, Mass.	P. J. Bolan, Waterbury.	34.00
			W. F. Andross, East Hartford.	36.00
			City Coal and Wood Co., New Britain.	36.00
2974	Dissolved Bone Phosphate.	H. S. Miller & Co., Newark, N J.	Staples & Raymond, Westport.	32.00
			A. Williams, Collinsville.	32.00
2907	Fish and Potash.	Joseph Church & Co., Tiverton, R. I.	H. K. Brainard, Thompsonville.	28.00
2875	Fish and Potash, Crossed Fishes Brand.	Quinnipiac Co., New London.	Olds & Whipple, Hartford.	37.00
			B. E. Johnson, Higganum.	34.00
			J. F. Silliman, New Canaan.	38.00
			A. L. Martin, Wallingford.	34.00
			J. P. Little, Columbia.	35.00
2807	Pilgrim Fertilizer.	J. S. Reese & Co., New Bedford, Mass.	Ansell Arnold & Co., Willimantic.	24.00
2854	Clark's Cove Company's King Philip Alkaline Guano.	J. S. Reese & Co., Licensees, New Bedford, Mass.	Ansell Arnold & Co., Willimantic.	24.65
			H. H. Davenport, Pomfret.	30.00
2829	Cecrops Fertilizer.	F. Ludlam, 140 Maiden Lane, N. Y.	Ahlquist & Allison, Portland.	38.00
			C. H. Cleveland, Brooklyn.	42.00
2830	Farmers' Friend Fertilizer.	Read Fertilizer Co., N. Y.	W. F. Andross, East Hartford.	35.00
			R. P. Hubbard, Middletown.	34.00
			H. E. Ives, Cheshire.	35.00

NITROGENOUS SUPERPHOSPHATES AND GUANOS SAMPLED BY THE STATION—*Concluded.*

Station No.	Name or Brand.	Manufacturer.	Dealer.	Dealers' cash price per ton.
2827	Cereal Fertilizer.	F. Ludlam, 140 Maiden Lane, N. Y.	W. J. Starr, Groton.	$32.00
			W. Tillinghast, Plainfield.	32.00
			Ahlquist & Allison, Portland.	32.00
			C. A. Young, Danielsonville.	31.00
			C. H. Cleveland, Brooklyn.	32.00
2799	Ammoniated Bone Superphosphate.	Crocker Fertilizer Co., Buffalo, N. Y.	L. Browning, New London.	37.00
			Dix & Wells, Wethersfield.	35.00
			L. L. Herman, Noroton.	35.00
			J. E. Leonard, Jewett City.	36.00
			Haley & Cheeseboro, Stonington.	45.00
2825	Lion Brand Fertilizer.	Read Fertilizer Co., N. Y.	R. P. Hubbard, Middletown.	30.00
			W. Tillinghast, Plainfield.	33.00
			H. E. Ives, Cheshire.	32.00
			W. F. Andross, East Hartford.	32.00
2796	New Rival Phosphate.	Crocker Fertilizer Co., Buffalo, N. Y.	L. L. Herman, Noroton.	32.00
			L. Browning, New London.	35.00
			J. A. Lewis, Willimantic.	30.00
2890	Peruvian Guano. Cargo C. R. Lewis.	Mapes' Formula and Peruvian Guano Co., 158 Front St., N. Y., Importers.	Mapes' Branch, Hartford.	62.00
2855	Alkaline Bone Phosphate.	E. Frank Coe, 16 Burling Slip, N. Y.	Backus Bros., South Windham.	34 00
			H. S. Hall, (2d) Wallingford.	35.00
851	Triangle A, Fish and Potash.	Bradley Fertilizer Co., 27 Kilby St., Boston, Mass.	Burtis & Mead, New Canaan.	33.00
			Raymond Bros., South Norwalk.	30.00
2831	Fish and Potash.	Farmers' Fertilizer Co., Syracuse, N. Y.	A. C. Sternberg, Hartford.	34.00
2856	High Grade Fish and Potash.	E. Frank Coe, 16 Burling Slip, N. Y.	W. T. Andrews, Orange.	29.00
			F. P. Burr & Co., Middletown.	30.00
2895	Davidge Vegetator.	Davidge Fertilizer Co., 121 Front St., N. Y.	J. M. Burke, South Manchester.	35.00
2894	Ammoniated Bone Superphosphate.	Stearns Fertilizer Co., 181 Front St., N. Y.	R. P. Hubbard, Middletown.	34.00
2832	Standard Special Formula.	Farmers' Fertilizer Co., Syracuse, N. Y.	W. H. Childs, Manchester.	32.00
2872	Economical Bone Fertilizer.	Wilkinson & Co., 54 William St., N. Y.	R. H. Coley, Southport.	32.00

Analyses of Nitrogenous Superphosphates Sampled by the Station.

Station No.	Name or Brand.	Nitrogen.					Phosphoric Acid.							Potash.		Chlorine.	Cost per Ton.	Valuation per Ton.	Percentage Difference between Cost and Valuation.
		Nitrogen as Nitrates.	Nitrogen as Ammonia.	Nitrogen, Organic.	Total Nitrogen Found.	Nitrogen Guaranteed.	Soluble.	Reverted.	Insoluble.	Total Found.	Total Guaranteed.	Available. Found.	Available. Guaranteed.	Found.	Guaranteed.				
2909	Wilcox's Dry Ground Fish Guano	----	---	8.61	8 61	*8.0*	.93	4.20	1.93	7.06	----	5.13	*4.0*	----	----	----	$32.00	$38.23	16.3*
2879	Wilcox's Acidulated Fish Guano	----	.97	4.59	5.56	*5.5*	1.76	2.72	.47	4.95	----	4.48	*4.0*	----	----	----	22.00	26.09	15.7*
2919	Quinnipiac Dry Ground Fish	----	----	9.26	9.26	*7.5*	81	3.60	2.43	6.84	----	4.41	*4.0*	----	----	----	36.00	39.64	9.2*
2908	Church & Co.'s Pure Dry Fish	----	----	8.84	8.84	*8.2*	.72	4.26	2.71	7.69	----	4.98	*6.8*	----	----	----	47.50 36.00	47.60 39.23	3.4* 8.2*
2748	Sanderson's Formula, A.A.	2.33	----	2.14	4.47	*3.3*	4.40	2.64	.74	7.78	*10.0*	7 04	*6.0*	8.64	*6.0*	2.26	35.00	34.96	0.1
2891	G. W. Miller's Flour of Bone Phosphate	1.12	.21	3.33	4.66	*4.0*	----	----	----	12.60†	*9.0*	----	----	4.92	*4.1*	3.98	35.00	34.63	5.1 1.0
2828	Kelsey's Fish and Potash	----	.78	3.24	4.02	*3.3*	2.56	3.16	.68	6.40	*4.0*	5.72	----	3.51	*3.0*	1.21	27.00	26.65	1.0
2880	Shoemaker's Swift Sure Superphosphate	.57	----	2.57	3.14	*2.5*	8.03	3.86	3.54	15.43	----	11.89	*9.0*	4.87	*4.0*	.32	37.50	36.87	1.7
2857	Russell Coe's Ammoniated Bone Phosphate	----	----	2.82	2.82	*1.7*	6.08	2.70	1.07	9.85	*10.0*	8.78	*8.0*	4.58	*2.0*	4.67	30.00	28.13	6.6
2904	H. S. Miller's Harvest Queen Phosphate	----	----	1.71	1.71	*.8*	6.14	2.69	1.11	9.94	----	8.83	*10.0*	2.61	*1.5*	.30	25.00	23.36	7.0
2874	Quinnipiac Market Garden Manure	.59	1.18	1.80	3.57	*3.3*	4.70	5.66	.86	11.22	----	10.36	*8.0*	7.05	*7.0*	.42	40.00	36.66	9.1
2802	Lister's Standard or Success Fertilizer	----	----	2.03	2.03	*1.0*	7.36	2.79	2.17	12.32	----	10.15	*10.0*	1.37	*1.3*	.52	28.00	25.61	9.3
2823	Lister's Ammoniated Bone Phosphate	----	----	2.05	2.05	*1.8*	7.05	2.51	2.47	12.03	----	9.56	*9.0*	1.56	*1.5*	.18	28.00	25.31	10.6
2873	Cumberland Superphosphate	.31	----	2.13	2.44	*2.0*	6.24	6.48	2.12	14.84	*12.0*	12.72	----	1.96	*2.0*	.78	34.50	31.17	10.7
7261	Quinnipiac Pine Island Phosphate	----	----	2.48	2.48	*2.0*	4.95	7.08	1.34	13.37	----	12.03	*9.0*	1.07	*1.0*	1.24	32.00	28.73	11.4

* Valuation exceeds cost. † A mixture of fertilizer chemicals and ground bone, 89 per cent. of which passes holes $\frac{1}{25}$ inch in diameter.

ANALYSES OF NITROGENOUS SUPERPHOSPHATES SAMPLED BY THE STATION—*Continued.*

Station No.	Name or Brand.	Nitrogen.					Phosphoric Acid.							Potash.		Chlorine.	Cost per Ton.	Valuation per Ton.	Percentage Difference between Cost and Valuation.
		Nitrogen as Nitrates.	Nitrogen as Ammonia.	Nitrogen, Organic.	Total Nitrogen Found.	Nitrogen Guaranteed.	Soluble.	Reverted.	Insoluble.	Total Found.	Total Guaranteed.	Available. Found.	Available. Guaranteed.	Found.	Guaranteed.				
2795	Mapes' Complete Manure, A Brand	.35	.72	1.90	2.97	*2.5*	7.39	4.28	1.83	13.50	*12.0*	11.67	*10.0*	3.05	*2.5*	3.61	$36.00	$32.02	12.4
2839	Bowker's Fish and Potash	----	----	2.54	2.54	*2.3*	5.95	1.99	4.42	12.36	*8.0*	7.94	----	4.15	*4.0*	.27	32.50	28.68	13.3
2765	Baker's A.A. Ammoniated Bone Superphosphate	----	1.98	.86	2.84	*2.5*	11.14	1.65	.36	13.15	----	12.79	*10.0*	3.00	*2.0*	2.72	37.50	32.87	14.1
2797	Mapes' Complete Manure for General Use	.92	.64	2.17	3.73	*3.3*	7.16	3.68	2.02	12 86	----	10.84	*10.0*	4.17	*4.0*	3.51	39.00	34.17	14.1
2766	National Fertilizer Co 's Ammoniated Bone Phosphate	----	----	2.63	2.63	*1.7*	7.26	3.00	.78	11.04	*9.0*	10.26	*7.0*	2.57	*2.0*	1.18	32.50	28.14	15.5
2822	Bradley's Farmers' New Method Fertilizer	---	----	2.31	2.31	*1.6*	7.74	2.72	1.30	11.76	*10 0*	10.46	*8.0*	2.88	*3.0*	2.79	32.00	27.70	15.5
2860	Darling's Animal Fertilizer	----	.41	2.80	3.21	*3.3*	3.90	4.21	3.40	11.51	*10 0*	8.11	----	5.29	*4.0*	4.09	35.00	20.28	15.6
2798	Mapes' Complete Manure for Light Soil	1.54	1.44	2.37	5.35	*4.9*	4.96	3.31	2.03	10.30	*8.0*	8.27	*7.0*	7.05	*6.0*	6.70	44.00	37.91	16.1
2762	Williams & Clark's Ammoniated Bone Superphosphate, Americus Brand	.16	.68	1.94	2.78	*2.0*	7.47	4.34	.62	12.43	*11.0*	11.81	*10.0*	1.99	*2.0*	2.00	35.00	29.99	16.7
2793	Chittenden's Fish and Potash	----	.96	2.92	3.88	*3.3*	1.31	4.37	3.10	8.78	*6.0*	5.68	----	5.05	*5.0*	4.95	33.00	28.26	16.8
2876	Quinnipiac Fish and Potash, Plain Brand	----	.56	2.25	2.81	*2.0*	1.60	3.31	3.00	7.91	*6.0*	4.91	*4.0*	5.22	*4.0*	4 97	28.00	23.59	18.7
2760	Quinnipiac Phosphate	.29	.51	1.93	2.73	*2.5*	4.46	7.50	1.42	13.38	----	11.96	*9.0*	1.90	*2.0*	2.40	36.00	30.08	19.7
2815	Bowker's Ammoniated Bone Phosphate	.43	----	1.81	2.24	*2.0*	6.29	3.25	3.33	12.87	*10.0*	9.54	*8.0*	2.19	*2.0*	2.74	31.50	26.32	19.7
2976	Miller's Standard Superphosphate	----	.15	2.56	2.71	*2.4*	9.76	.69	.26	10.71	----	10.45	*10.0*	2.75	*1.5*	.30	35.00	29.22	19.7
2841	Bradley's Sea Fowl Guano	.20	.29	2.12	2.61	*2.5*	8.69	2.05	1.16	11.90	*11.0*	10.74	*9 0*	2.13	*2.0*	2.31	34.00	28.39	19.8
2882	Williams & Clark Co.'s Royal Bone Phosphate	----	---	1.66	1.66	*.8*	5.78	2.62	2.29	10.69	----	8.40	*7.0*	2.70	*2.0*	.36	29.00	23.30	20.4

Analyses of Nitrogenous Superphosphates Sampled by the Station—*Continued.*

Station No.	Name or Brand.	Nitrogen.					Phosphoric Acid.							Potash.		Chlorine.	Cost per Ton.	Valuation per Ton.	Percentage Difference between Cost and Valuation.
		Nitrogen as Nitrates.	Nitrogen as Ammonia	Nitrogen, Organic.	Total Nitrogen Found.	Nitrogen Guaranteed.	Soluble.	Reverted.	Insoluble.	Total Found.	Total Guaranteed.	Available. Found.	Available. Guaranteed.	Found.	Guaranteed.				
2852	Bradley's Anchor Brand Fish and Potash	----	----	3.76	3.76	*3.3*	4.76	1.84	1 36	7.96	*5.0*	6.60	*3.0*	2.67	*3.0*	4.64	$32.00	$26.39	21.3
2820	Bradley's Patent Superphosphate of Lime	.20	.14	2.37	2.71	*2.3*	8.53	2.42	1.10	12.05	----	10.95	*9.0*	1.98	*1.5*	2.00	35.00	28.84	21.4
2768	E. F. Coe's High Grade Phosphate	----	----	2.24	2.24	*2.0*	8.67	1.75	1.54	11.96	*11.0*	10.42	*9.0*	2.53	*2.0*	.33	34.00	27.95	21.6
2800	Chittenden's Complete Fertilizer	.81	----	3.03	3.84	*3.3*	3 34	5.60	3.79	12.73	*8.0*	8.94	*6.0*	5.49	*6.0*	1.84	42.00	34.52	21.7
2833	Reese's New England Favorite	----	----	2.51	2 51	*2.3*	6.86	3.31	2.84	13 01	*10 5*	10.17	*9.0*	1.81	*2.0*	2.05	34.00	27.83	22.1
2813	Clark's Cove Bay State Fertilizer, G. G.	----	.28	2.06	2.34	*1.9*	7.26	1.35	3.58	12 19	*10.5*	8.61	*8.5*	2.70	*2.3*	2.21	32 00	26.19	22.2
2889	Apothecaries Hall Co.'s Victor Phosphate	----	----	2.33	2.33	*2.5*	7.68	1.36	.04	9.08	*8.5*	9.04	----	2 24	*2 0*	1.97	30.00	24.30	22.6
2892	Read's Fish and Potash	----	----	2.78	2.78	*2.5*	3.52	2.46	1.73	7.71	*6.0*	5.98	*4.0*	4.96	*4 0*	5.05	30.00	24.28	23.5
2803	Bowker's Hill and Drill Phosphate	.81	----	2.05	2.86	*2.5*	7.52	2.21	2 64	12.37	*11.0*	9.73	*10.0*	2.40	*2.0*	.25	36 00	29.03	24.0
2905	Olds & Whipple's Special Phosphate	.87	----	2.07	2.94	----	8.61	1.07	.78	10.46	----	9.68	----	2.18	----	.42	35.00	27.88	25.5
2910	G. W. Miles' IXL Phosphate	----	.31	1.47	1.78	*2.0*	7.71	1.81	.74	10.26	----	9.52	*9.0*	2.26	*1.5*	1.86	30.00	23.60	27.1
2843	Original Coe's Superphosphate	.47	----	1.66	2.13	*2.1*	8.45	2.40	1.24	12.09	*10.0*	10.85	*8.0*	.99	*1.0*	1.13	33.00	25.77	28.1
2835	Soluble Pacific Guano	1.85	----	.70	2.55	*2.3*	8.10	2.68	1.36	12.14	*10.5*	10.78	*8.5*	1.97	*2.0*	1.92	35.00	27.33	28.1
2974	H. S. Miller's Dissolved Bone	----	.10	1.73	1.83	*1.6*	7.82	1.55	.65	10.02	*9.5*	9.37	*8 0*	2.94	*1.5*	.25	32.00	24.88	28.6
2907	Church & Co.'s Fish and Potash	----	.30	2.96	3.26	*3.3*	1.55	2.71	.88	5.14	*5.0*	4.26	----	3.89	*8.0*	6.90	28.00	21.67	29.2
2875	Quinnipiac Fish and Potash, Crossed Fishes Brand	----	.78	3.02	3.80	*3.3*	1.12	3.79	3.57	8.48	*5.0*	4.91	*3 0*	4.41	*3.0*	4.06	34.00	26.51	32.0

ANALYSES OF NITROGENOUS SUPERPHOSPHATES SAMPLED BY THE STATION—*Concluded.*

Station No.	Name or Brand.	Nitrogen.					Phosphoric Acid.							Potash.		Chlorine.	Cost per Ton.	Valuation per Ton.	Percentage Difference between Cost and Valuation.
		Nitrogen as Nitrates.	Nitrogen as Ammonia.	Nitrogen, Organic.	Total Nitrogen Found.	Nitrogen Guaranteed.	Soluble.	Reverted.	Insoluble.	Total Found.	Total Guaranteed.	Available. Found.	Available. Guaranteed.	Found.	Guaranteed.				
2807	Reese's Pilgrim Fertilizer	----	.28	1.42	1.70	*1.0*	5.70	1.00	2.22	8.92	*7.5*	6.70	*6.5*	2.99	*2.5*	2.57	$27.00	$20.42	32.2
2854	Clark's Cove King Philip Alkaline Guano	----	----	1.73	1.73	*1.2*	6.35	1.37	2.31	10.03	*7.5*	7.72	*6.5*	3.29	*3.0*	2.33	30.00	22.51	33.3
2829	Ludlam's Cecrops Fertilizer	.64	----	1.85	2.49	*3.3*	8.05	1.39	1.18	10.62	----	9.44	*7.0*	6.80	*7.0*	5.89	40.00	29.95	33.6
2830	Read's Farmers' Friend Fertilizer	---	----	1.95	1.95	*2.0*	7.37	2.92	1.62	11.91	*11.0*	10.29	*9.0*	2.25	*2.0*	2.23	34.50	25.80	33.7
2827	Ludlam's Cereal Fertilizer	.59	----	.87	1.46	*1.2*	8.64	1.26	2.11	12.01	*11.0*	9.90	*8.0*	2.34	*4.0*	4.01	32.00	23.78	34.6
2799	Crocker's Ammoniated Bone Superphosphate	----	----	2.97	2.97	*2.9*	6.77	2.09	1.60	10.46	----	8.86	*10.0*	1.49	*1.0*	1.25	36.00	26.37	36.5
2825	Read's Lion Brand Fertilizer	----	----	1.20	1.20	*.8*	6.64	2.74	1.33	10.71	*10.0*	9.38	*8.0*	4.19	*4.0*	4.80	32.00	23.39	36.7
2796	Crocker's New Rival Phosphate	----	----	1.48	1.48	*1.2*	6.51	2.76	2.59	11.86	----	9.27	*10.0*	2.14	*1.6*	2.13	32.00	23.07	38.7
2890	Mapes' Peruvian Guano	----	5.15	1 35	6.50	*6.7*	7.44	3.99	3.27	14.70	*14.7*	11.43	----	2.99	*3.0*	4.28	62.00	44.65	38.8
2855	E. F. Coe's Alkaline Bone Phosphate	----	----	1.42	1.42	*1.0*	6.96	2.70	3.47	13.13	*11.0*	9.66	*9.0*	2.07	*2.0*	.52	34.00	24.38	39.5
2851	Bradley's Triangle A, Fish and Potash	----	.62	2.00	2.62	*2.0*	3.25	1.60	1.35	6.20	*6.0*	4.85	*4.0*	3.99	*4.0*	6.12	30.00	20.91	43.5
2831	Farmers' Fertilizer Co.'s Fish and Potash	----	----	1.69	1.69	*1.6*	4.26	2.33	1.25	7.84	*7.0*	6.59	*6.5*	7.42	*13.0*	7.49	34.00	23.50	44.7
2856	E. F. Coe's High Grade Fish and Potash	----	----	2.21	2.21	*3.0*	.51	3.75	4.66	8.92	*6.0*	4.26	*4.0*	3.10	*2.0*	7.04	29.50	19.56	50.8
2895	Davidge's Vegetator	----	----	3.03	3.03	*2.9*	4.67	.82	.07	5.56	----	5.49	*5.0*	3.85	*4.0*	7.99	35.00	22.51	55.4
2894	Stearn's Ammoniated Bone Superphosphate	trace	.37	1.29	1.66	*1.6*	2.82	4.41	2.79	10.02	*8.5*	7.23	----	2.88	*2.5*	1.38	34.00	21.36	59.2
2832	Farmers' Fertilizer Co.'s Standard Special Formula.	.09	----	.65	.74	*.8*	7.30	2.09	.63	10.02	*10.0*	9.39	*8.0*	1.88	*4.0*	8.85	32.00	19.36	65.3
2872	Wilkinson's Economical Bone Fertilizer	----	----	1.02	1.02	*1.2*	.24	4.17	5.52	9.93	*6.0*	4.41	----	3.11	*3.0*	.44	32.00	17.00	88.2

Notes on Particular Analyses.

An analysis of READ'S HIGH GRADE FARMERS' FRIEND FERTILIZER was made on a mixture of two dealers' samples, one from W. Tillinghast, Plainfield, the other from W. F. Andross, East Hartford. This analysis is given below, No. **2877.** The manufacturers claim that this does not represent the average quality of the brand. As no other lots of this article were sampled by our agents, further analyses could not be made. Nitrogen, phosphoric acid and potash were, however, determined separately in each of the two samples from which the mixture had been made, Nos. **2936** and **2937,** and also in the sample deposited here at the beginning of the season by the manufacturer, No. **2938.** The results follow :

READ'S HIGH GRADE FARMER'S FRIEND FERTILIZER.

	2877	2936	2937	2938
Nitrogen	3.04	3.20	3.20	3.71
Nitrogen guaranteed	**3.3**	----	--	----
Soluble Phosphoric Acid	4.13	----	----	2.96
Reverted " "	2.07	----	----	3.13
Insoluble " "	1.36	----	----	2.62
Total Phosphoric Acid	7.56	7.60	7.25	8.71
Phosphoric Acid, guaranteed	**6.0**	----	----	----
Potash	9.64	9.49	9.52	7.87
Potash, guaranteed	**10.0**	----	----	----
Chlorine	9.15	----	----	----
Cost per ton	$38.50	----	----	----
Valuation	$29.56	----	----	30.70

The results show that the two samples were practically alike in composition, but contained half a per cent. less nitrogen and 1.7 per cent. more potash than the manufacturers' standard sample.

An analysis of E. F. COE'S "GOLD BRAND EXCELSIOR GUANO" was made on a mixture of two samples, one from stock of Arnold Rudd, New London, the other from D. N. Clark, Shelton. This analysis is given below, No. **2808.** The manufacturer states that this cannot possibly represent the Gold Brand ; that it has never run lower than 6 per cent. of potash and 2¾ per cent. of ammonia, while the phosphoric acid could not run over 9 per cent.

The great and unusual discrepancy between guarantee and actual composition creates a suspicion that the goods were not of this brand. Our sampling agent, however, distinctly remembers that the samples were drawn from bags bearing the Gold Brand mark. The determinations of nitrogen, phosphoric acid and potash in the separate samples are given below for comparison. We do not feel at liberty to suppress the analysis, while we accept the manufacturers' statement, that it does not represent the goods, and for that reason it has not been tabulated with other analyses of superphosphates.

E. F. Coe's Gold Brand Excelsior Guano.

	2808	2939	2940
Nitrogen, as Ammonia	.74	----	----
Organic Nitrogen	1 04	----	----
Total Nitrogen	1.78	1.53	2.11
Nitrogen, guaranteed	2.5	----	----
Soluble Phosphoric Acid	7.71	----	----
Reverted " "	2.14	----	----
Insoluble " "	1.79	----	----
Total Phosphoric Acid	11.64	12.56	11.12
Phosphoric Acid, guaranteed	**8.0**	----	----
Potash	4.27	3.47	4.74
Potash, guaranteed	**6.0**	----	----
Chlorine	.46	----	----
Valuation per ton	$27.63	----	----

Of "Bradley's Superphosphate," 29 samples were drawn by our agents, about half of them in the northern and half of them in the southern counties of the State. A mixture was prepared of equal parts of all of them, and on this mixture was made analysis No. **2820,** given on page 46, and reprinted below for comparison.

To test the accuracy of the work of sampling both by the agents and in the laboratory, a mixture was prepared of all samples drawn in the northern counties, No. **2885,** and another of all samples drawn in the southern counties, No. **2886,** and these were separately analyzed with the results below given, which show satisfactory agreement, and demonstrate the ability of the manufacturer to turn out a thoroughly uniform product, and the ability of the Station to put before consumers an accurate knowledge of the fertilizers they are using.

	2820	2885	2886
Nitrogen as nitrates	.20	.20	.20
Nitrogen as ammonia	.14	.16	.16
Organic Nitrogen	2.37	2.26	2.38
Total Nitrogen	2.71	2.62	2.74
Soluble Phosphoric Acid	8.53	8.54	8.35
Reverted " "	2.42	2.35	2.45
Insoluble " "	1.10	1.16	1.19
Total " "	12.05	12.05	11.99
Potash	1.98	1.74	1.89
Chlorine	2.00	1 98	1.66
Valuation	$28.84	28.28	28.68

Similarly agreeing results were also obtained in the case of another brand, which it is not necessary to present in detail.

2. Manufacturers' Samples.

The fertilizers named below, with the exception of Nos. **2913** and **2915,** were not found by the Station agents in any stock which they inspected, and accordingly the analyses were made on samples deposited at the Station by manufacturers.

2899. Bone and Potash, Circle Brand, made by Bradley Fertilizer Co., Boston, Mass.

2810. Dry Ground Fish, made by Joseph Church & Co., Tiverton, R. I.

2809. Fish and Potash, made by Joseph Church & Co., Tiverton, R. I.

2916. Red Brand Excelsior Guano, made by E. Frank Coe, New York.

2900. Buffalo Superphosphate, No. 2, made by Crocker Fertilizer Co., Buffalo, N. Y.

2902. Queen City Phosphate, made by Crocker Fertilizer Co., Buffalo, N. Y.

2903. Vegetable Bone Superphosphate, made by Crocker Fertilizer Co., Buffalo, N. Y.

2911. Extra Bone Phosphate, made by L. B. Darling, Pawtucket, R. I.

2966. Davidge's Special Favorite, made by Davidge Fertilizer Co., New York.

2913. Clark's Cove Co.'s Great Planet A, made by J. S. Reese & Co., licensees, New Bedford, Mass.

2915. Pacific Fish and Potash, made by W. D. Stewart & Co., Boston, Mass.

2679. Wilcox's Dry Ground Fish Guano, and **2680,** Wilcox's Acidulated Fish Guano, both made by Leander Wilcox, Mystic Bridge.

Manufacturer's Samples—Analyses and Valuations.

	2899	2810	2809	2916	2900	2902	2903	2911	2966	2913	2915	2679	2680
Nitrogen as nitrates	----	----	----	.23	----	----	----	.41	----	.99	----	----	----
Nitrogen as ammonia	.20	----	.36	1.44	----	----	----	.25	.45	----	----	.21	1.19
Nitrogen, organic	1.51	7.10	3.22	2.30	----	1.71	4.07	3.10	1.03	2.42	3.33	8.16	4.84
Total Nitrogen found	1.71	7.10	3.58	3.97	----	1.71	4.07	3.76	1.48	3.41	3.33	8.37	6.03
Nitrogen guaranteed	**1.8**	**8.2**	**3.3**	**3.3**	----	**1.7**	**5.0**	----	**1.2**	**3.3**	**3.0**	----	----
Soluble phosphoric acid	trace	----	1.63	7.61	11.47	7.31	6.38	4.75	8.32	4.08	4.14	.89	1.28
Reverted phosphoric acid	8.23	----	2.74	.87	2.04	2.17	1.59	4.22	2.99	4.88	2.02	3.73	3.00
Insoluble phosphoric acid	5.73	----	.72	1.15	.92	1.82	.55	2.19	1.75	2.81	.74	2.35	.95
Total phosphoric acid found	13.96	8.05	5.09	9.63	14 43	11.30	8.52	11.16	13.06	11.77	6.90	6.97	5 23
Phosphoric acid guaranteed	**8.0**	----	**5.0**	----	**12.0**	**9.0**	**7.0**	----	----	**8.3**	**6.0**	----	----
Available phosphoric acid found	8.23	----	4.37	8.48	13.51	9.48	7.97	8.97	11.31	8.96	6.16	4.62	4.28
Available phosphoric acid guaranteed	----	----	----	**10.0**	**11.0**	**8.0**	**6.0**	----	**10.0**	**7.3**	**4.0**	----	----
Potash	4.45	----	4.19	4.00	1.91	2.16	7.42	3.68	2.11	9.50	2.53	----	----
Potash guaranteed	**2.0**	----	**3.0**	**4.8**	**1.0**	**1.0**	**6.0**	----	**1.5**	**9.5**	**4.0**	----	----
Chlorine	10.76	----	7.27	.12	1.96	2.16	6.70	1.12	2.17	9.22	3.39	----	----
Valuation per ton	$25.61	----	29.03	32.32	23.68	23.81	33.45	31.80	25.78	35.19	23.70	36.88	27.63

3. *Samples drawn by Private Individuals.*

2859. Sanderson's Formula A. Made by L. Sanderson, New Haven. Sampled from stock bought by J. H. Webb, Hamden. See also analysis No. **2748**, page 44.

ANALYSIS.	2859
Nitrogen as nitrates	.47
Nitrogen as ammonia	1.27
Organic nitrogen	2.89
Soluble phosphoric acid	4.11
Reverted phosphoric acid	2.88
Insoluble phosphoric acid	1.71
Potash	7.96
Chlorine	3.32
Cost per ton	$35.00
Valuation per ton	35.67

II. SPECIAL MANURES.

1. *Sampled by Station Agents.*

For Analyses and Valuations see pages 55–61.

Here are included such Nitrogenous Superphosphates as are claimed by their manufacturers to be specially adapted to the needs of particular crops.

Guarantees.—Of the thirty-three samples analyzed ten are below the maker's minimum guarantee as regards one ingredient and two are below guarantee on two ingredients.

COST AND VALUATION.—In one case the valuation exceeded the cost.

The average cost of 33 special manures has been $39.18 and the average valuation $32.90. The difference between cost and valuation has been $6.28 and the Percentage Difference 19.0. The corresponding difference in case of the superphosphates (see page 35) was 18.3 per cent.

This year the Special Manures as a class have been higher-priced and more concentrated than the other nitrogenous superphosphates, but not as heretofore more economical to purchase.

Manufacturers' Samples of Special Manures.

The fertilizers named below were not found by the Station agents in any stock which they inspected, and accordingly the analyses were made on samples deposited at the Station by manufacturers.

2898. Complete manure for Grass and Grain, made by Bradley Fertilizer Co., Boston, Mass. Sent in April.

2961. Bradley's Complete Manure for Grass and Grain. Sent in July.

2901. Special Potato Manure, made by Crocker Fertilizer Co., Buffalo, N. Y.

2912. Great Eastern General Fertilizer for Oats, Buckwheat, and Seeding Down. Made by Great Eastern Fertilizer Co., Rutland, Vt.

2914. Concentrated Manure for Tobacco and Cabbage, made by J. S. Reese & Co., New Bedford, Mass.

The analysis of **2898,** it was claimed by the manfacturer, did not represent the average quality of the goods, though sent to us from the factory. A second sample was accordingly sent from the factory in July and was also analyzed, (No. **2961.**)

ANALYSES AND VALUATIONS.

	2898	2961	2901	2912	2914
Nitrogen as Nitrates	4.54	4.84	1.44	----	.41
Nitrogen as Ammonia	----	----	----	----	.27
Organic Nitrogen	.08	.09	2.35	1.02	3.28
Total Nitrogen found	4.62	4.93	3.79	1.02	3.96
Nitrogen, guaranteed	*4.94*	*4.9*	*3.7*	*.8*	*4.1*
Soluble Phosphoric Acid	3.28	6.19	6.69	6.83	4.69
Reverted Phosphoric Acid	2.30	1.97	1.84	1.80	2.03
Insoluble Phosphoric Acid	.94	1.01	1.77	1.03	2.43
Total Phosphoric Acid found	6.52	9.17	10.30	9.66	9.15
Phosphoric Acid, guaranteed	*7.0*	*7.0*	*9.0*	*9.0*	*6.0*
Available Phosphoric Acid found	5.58	8.16	8.53	8.63	6.72
Available Phosphoric Acid, guaranteed	----	----	*8.0*	*8.0*	*5.0*
Potash	2.63	3.39	6.74	3.85	5.97
Potash, guaranteed	*2.5*	*2.5*	*5.5*	*4.0*	*5.0*
Chlorine	.45	.40	6.32	4.69	4.82
Valuation per ton	$25.69	$31.73	$32.77	$21.19	$30.65

Notes on Particular Analyses.

Analyses Nos. **2837** and **2838** given below are objected to by the manufacturer as not representing the average composition of the goods, Stockbridge Top Dressing. No other samples of this brand were found by our agents, and no other analyses could be made. On account of the manufacturer's protest, these analyses

are not tabulated with the others. It sometimes happens that goods are re-bagged by the dealer when the original bags are torn or rotted, and in such cases there is chance that the new bags may bear the wrong brand. Wrong tags may also occasionally be attached to unstenciled bags at the factory.

Stockbridge Top Dressing.

	2837	2838
Nitrogen as nitrates	1.75	1.96
Organic Nitrogen	2.83	2.41
Total Nitrogen	4 58	4.37
Soluble Phosphoric Acid	3.10	1.09
Reverted "	1.38	3.49
Insoluble "	5.96	6.59
Total Phosphoric Acid	10.44	11.17
Potash	4.46	5.24
Chlorine	4.49	4.79
Valuation per ton	$29.33	29.56

In the table below, **2794**, is an analysis made on a mixture of four samples of H. S. Miller & Co.'s Special Potato Manure. The manufacturer stated that the per cent. of phosphoric acid found was less than the brand should contain. Phosphoric acid was accordingly determined in each of the four samples, and the following per cents. were found: 5.41, 7.91, 7.82, 7.84. Evidently the first sample was unlike all the rest. It was, therefore, rejected, and a mixture of the other three gave the analysis, No. 2950, as follows:

H. S. Miller & Co.'s Special Potato Manure.

	2794	2950
Nitrogen as nitrates	.52	---
Nitrogen as ammonia	2.31	3.07
Organic Nitrogen	1.10	.78
Soluble Phosphoric Acid	4.53	3.89
Reverted "	1.95	3.08
Insoluble "	.47	.92
Potash	7.76	7.88
Chlorine	.42	.37
Valuation per ton	$32.70	33.79

Special Manures Sampled by the Station.

Station No.	Name or Brand.	Manufacturer.	Dealer.	Dealers' cash price per ton.
2684	Fairchild's Formula for Seeding Down.	Rogers & Hubbard Co., Middletown.	Manufacturers.	$40.00
2710	Soluble Potato Manure.	Rogers & Hubbard Co., Middletown.	Manufacturers.	37.00
2685	Fairchild's Formula for Corn and General Crops.	Rogers & Hubbard Co., Middletown.	Manufacturers.	46.00
2951	Mapes' Seeding Down Manure.	Mapes' F. & P. G. Co., New York.	Mapes' Branch, Hartford.	37.50
2871	Fruit and Vine Manure.	Mapes' Formula and Peruvian Guano Co., New York.	Mapes' Branch, Hartford.	38.00
2819	Complete Manure for Potatoes and Vegetables.	Bradley Fertilizer Co., 27 Kilby St., Boston, Mass.	D. N. Clark & Sons, Milford.	39.00
			Geo. Dickinson, Haddam.	40.00
			Wilson & Burr, Middletown.	38.00
			J. E. Holmes, Stratford.	38.00
			Carter & Strong, Manchester.	42.00
			F. S. Bidwell, Windsor Locks.	38.00
2801	Corn Manure.	Mapes' Formula and Peruvian Guano Co., New York.	Mapes' Branch, Hartford.	41.00
			W. W. Cooper, Suffield.	41.00
			G. K. Nason. Willimantic.	42.60
			J. P. Barstow & Co., Norwich.	41.00
			Dean & Horton, Stamford.	42.00
2858	Tobacco Manure, Connecticut Brand.	Mapes' Formula and Peruvian Guano Co., New York.	Mapes' Branch, Hartford.	45.00
			W. W. Cooper, Suffield.	45.00
2893	Americus High Grade Special for Tobacco.	Williams & Clark Fertilizer Co., 81 Fulton St., New York.	Hale, Day & Co., South Manchester.	40.00
			John Bransfield, Portland.	40.00
2824	Grass and Grain Spring Top Dressing.	Mapes' Formula and Peruvian Guano Co., New York.	G. K. Nason, Willimantic.	42.60
			W. W. Cooper, Suffield.	41.00
			Mapes' Branch, Hartford.	41.00
2804	Complete Potato Manure.	H. J. Baker & Bro., 215 Pearl St., N. Y.	M. T. Gregory & Co., Milford.	42.00
			Allen Betts, Norwalk.	42.00
			W. W. Cooper, Suffield.	42.50
			E. F. Hawley, Newtown.	42.50
2975	Corn Fertilizer.	H. S. Miller & Co., Newark, N. J.	G. T. Fowler, Branford.	32.00

SPECIAL MANURES SAMPLED BY THE STATION—*Continued.*

Station No.	Name or Brand.	Manufacturer.	Dealer.	Dealers' cash price per ton.
2952	Stockbridge Seeding Down Manure.	Bowker Fertilizer Co., 43 Chatham St., Boston, Mass.	Southington Lumber & Feed Co., Southington.	$40.00
2836	Complete Corn Manure.	H. J. Baker & Bro., 215 Pearl St., N. Y.	Strong & Tanner, Winsted.	40.00
			S. J. Hall, Meriden.	42.00
			W. W. Cooper, Suffield.	42.50
			I. J. Scoville, Bristol.	40.00
2950	Special Potato Manure.	H. S. Miller & Co., Newark, N. J.	Staples & Raymond, Westport.	42.00
			H. P. Treat, Orange.	40.00
2759	Potato Manure.	Mapes' Formula and Peruvian Guano Co., N. Y.	G. K. Nason, Willimantic.	44.50
			Mapes' Branch, Hartford.	43.00
			J. P. Barstow & Co., Norwich.	44.00
			Wilson & Burr, Middletown.	43.00
			Wheeler & Howe, Bridgeport.	45.00
2861	Tobacco Manure, Wrapper Brand.	Mapes' Formula and Peruvian Guano Co., N. Y.	W. W. Cooper, Suffield.	52.00
			Mapes' Branch, Hartford.	50.00
2818	Ammoniated Wheat and Corn Phosphate.	Crocker Fertilizer Co., Buffalo, N. Y.	J. A. Lewis, Willimantic.	35.00
			Dix & Wells, Wethersfield.	33.00
			C. A. Young, Danielsonville.	33.00
2840	Bowker's Tobacco Manure.	Bowker Fertilizer Co., 43 Chatham St., Boston, Mass.	W. B. Martin, Rockville.	44.00
2767	Potato Manure.	Williams & Clark Fertilizer Co., 81 Fulton St., N. Y.	Charles Stagg, Stratford.	35.00
			Joseph Roode, Jewett City.	36.00
			Daniel Morgan, Poquonock.	35.00
			H. K. Brainard, Thompsonville.	36.00
			C. L. Backus, Andover.	----
			F. S. Bidwell, Windsor Locks.	36.00
			Abbott & Co., Birmingham.	40.00

SPECIAL MANURES SAMPLED BY THE STATION—*Continued.*

Station No.	Name or Brand.	Manufacturer.	Dealer.	Dealers' cash price per ton.
2821	Potato Manure.	Bradley Fertilizer Co., 27 Kilby St., Boston, Mass.	A. C. Sternberg, Hartford.	$37.00
			F. S. Bidwell, Windsor Locks.	35.00
			D. N. Clark & Sons, Milford.	35.00
			Wilson & Burr, Middletown.	35.00
			N. C. Barker, Lebanon.	37.00
			D. Beers, Danbury.	38.00
			City Coal and Wood Co., New Britain.	40.00
			W. H. Cheney's Sons, South Manchester.	39.00
			Waterbury & June, Greenwich.	----
			Raymond Bros., South Manchester.	37.00
			W. B. Martin, Rockville.	37.00
			G. R. Fowler, Central Village.	----
			G. W. Carver, Putnam.	36.00
			Carter & Strong, Manchester.	39.00
			J. E. Leonard, Jewett City.	38.00
			G. A. Dickinson, Haddam.	38.00
			F. C. Root, Suffield.	38.00
			W. F. Andross, East Hartford.	36.00
			W. W. Cooper, Suffield.	36.00
			J. S. Wells, Hebron.	36.00
			E. B. Clark, Woodmont.	37.00
2763	Stockbridge Vegetable Manure.	Bowker Fertilizer Co., 43 Chatham St., Boston, Mass.	E. B. Clark, Milford.	38.00
			L. Browning, New London.	42.50
			E. B. Clark, Woodmont.	40.00
			J. A. Lewis, Willimantic.	40.00

SPECIAL MANURES SAMPLED BY THE STATION—*Continued.*

Station No.	Name or Brand.	Manufacturer.	Dealer.	Dealers' cash price per ton.
2842	Complete Manure for Corn and Grain.	Bradley Fertilizer Co., 27 Kilby St., Boston, Mass.	J. E. Holmes, Stratford.	$42.00
			D. N. Clark & Sons, Milford.	39.00
			Carter & Strong, Manchester.	42.00
2764	Potato Manure.	Quinnipiac Co., New London.	B. E. Johnson, Higganum.	34.00
			John Taylor, Old Mystic.	38.00
			J. S. Worthington, Portland.	40.00
			J. F. Silliman, New Canaan.	38.00
			D. C. Wood, Stratford.	38.00
			G. M. Williams, New London.	35.00
			Olds & Whipple, Hartford.	40.00
2816	Potato Manure.	E. Frank Coe, 16 Burling Slip, N. Y.	J. A. Amidon, Wethersfield.	40.00
			N. C. Barker, Lebanon.	36.00
			H. S. Hall, (2d) Wallingford.	40.00
2826	Great Eastern Vegetable, Vine and Tobacco Fertilizer.	Great Eastern Fertilizer Co., Rutland, Vt.	D. E. Stone, Cheshire.	33.00
			L. L. Herman, Noroton.	35.00
			F. Woodford, Farmington.	37.00
			Andrew Bonfoey, Higganum.	35.00
			W. A. Snow, Columbia.	35.00
2834	Reese's Concentrated Potato and Corn Manure.	J. S. Reese & Co., New Bedford, Mass.	W. Tillinghast, Plainfield.	39.00
2897	Stockbridge Fruit Manure.	Bowker Fertilizer Co., 43 Chatham St., Boston, Mass.	J. A. Paine, Danielsonville.	42.50
			J. A. Lewis, Willimantic.	40.00
2814	Stockbridge Corn Manure.	Bowker Fertilizer Co., 43 Chatham St., Boston, Mass.	E. S. Lincoln, Chaplin.	38.00
			S. R. Jones, Deep River.	40.00
			J. A. Lewis, Willimantic.	40.00
			City Coal and Wood Co., New Britain.	41.00
			W. B. Martin, Rockville.	41.00

SPECIAL MANURES SAMPLED BY THE STATION—*Concluded.*

Station No.	Name or Brand.	Manufacturer.	Dealer.	Dealers' cash price per ton.
2814	Stockbridge Corn Manure.	Bowker Fertilizer Co., 43 Chatham St., Boston, Mass.	J. A. Paine, Danielsonville.	$42.50
			J. M. Williams, Manchester.	39.00
			W. H. Anderson, Putnam.	42.00
2817	Potato, Hop and Tobacco Phosphate.	Crocker Fertilizer Co., Buffalo, N. Y.	Dix & Wells, Wethersfield.	35.00
			C. A. Young, Danielsonville.	36.00
			W. Tillinghast, Plainfield.	36.00
			L. L. Herman, Noroton.	35.00
			J. E. Leonard, Jewett City.	36.00
			L. Browning, New London.	37.00
			J. H. Fish, Newington.	38.00
			W. C. Russell, Orange.	35.00
			E. Hill, Moosup.	36.00
2853	General Fertilizer for Grain and Grass.	Great Eastern Fertilizer Co., Rutland, Vt.	W. A. Snow, Columbia.	35.00
2878	Potato Manure.	Davidge Fertilizer Co., 121 Front St., N. Y.	Henry Dackett, Andover.	40.00
2881	Stearns' Potato Grower.	Stearns Fertilizer Co., 181 Front St., N. Y.	R. P. Hubbard, Middletown.	34.00

Analyses of Special Manures Sampled by the Station.

Station No.	Name or Brand.	Nitrogen.					Phosphoric Acid.							Potash.					
		Nitrogen as Nitrates.	Nitrogen as Ammonia.	Nitrogen, Organic.	Total Nitrogen Found.	Nitrogen Guaranteed.	Soluble.	Reverted.	Insoluble.	Total Found.	Total Guaranteed.	Available. Found.	Available. Guaranteed.	Found.	Guaranteed.	Chlorine.	Cost per Ton.	Valuation per Ton.	Percentage Difference between Cost and Valuation.
2684	Fairchild's Formula for Seeding Down†	.25	----	2.81	3.06	*2 5*	----	----	----	16.61†	*18.0*	----	----	14.67	*12.5*	13.92	$40.00	$44.73	11.0*
2710	Rogers & Hubbard's Soluble Potato Manure	1.36	.72	3.24	5.32	*5.0*	1.08	6.20	3.61	10.89	*10.0*	7.28	----	5.33	*5.0*	.22	37.00	36.91	0.2
2685	Fairchild's Formula for Corn and General Crops‡	3.40	----	1.92	5.32	*5.5*	----	----	----	13.30‡	*12.0*	---	----	12.53	*13.0*	12.06	45.00	44.67	0.7
2951	Mapes' Seeding Down Manure	.83	.15	2.41	3.39	*2.5*	----	----	----	15.24§	*15.0*	----	----	11.71	*10.0*	11.56	37.50	34.29	9.3
2871	Mapes' Fruit and Vine Manure	.23	.35	1.42	2.00	*1.7*	8.77	.49	.14	9.40	----	9.26	*7.0*	11.16	*10.0*	.52	38.00	34.74	9.4
2819	Bradley's Comp. Manure for Potatoes and Vegetables	.38	1.39	1.99	3.76	*3.7*	7.06	2.64	.96	10.66	*9.0*	9.70	*8.0*	6.49	*6.0*	6.60	38.00	34.28	10 9
2801	Mapes' Corn Manure	.75	1.06	2.03	3.84	*3.7*	6.30	3.83	1.97	12.10	----	10.13	*10.0*	6.76	*6.0*	6.41	41.00	35.79	14.6
2858	Mapes' Tobacco Manure, Conn. Brand	.83	1.52	2.23	4.58	*4.7*	6.08	2.50	1.04	9.62	----	8.58	*7.8*	8.46	*7.8*	.59	45.00	39.19	14.8
2893	Williams & Clark's Americus High Grade Special for Tobacco	.72	1.17	1.60	3.49	*3.7*	4.32	4.85	1.88	11.05	*8.0*	9.17	*7.0*	6.70	*7.0*	.20	40.00	34.80	14.9
2824	Mapes' Grass and Grain Spring Top Dressing	1.54	1.44	1.89	4.87	*4.1*	5.74	2.80	1.69	10.23	*7.0*	8.54	*7.0*	5.93	*5.0*	5.51	41.00	35.55	15.3
2804	Baker's Comp. Potato Manure	----	3.43	.77	4.20	*3.3*	5.98	1.40	.30	7.68	----	7.38	*5.0*	9.98	*10.0*	5.02	42.00	36.11	16.3
2952	Stockbridge Seeding Down Manure	1.56	.15	1.93	3.64	*2.5*	7.36	2.25	2.25	11.86	*12.0*	9.61	*6.0*	4.88	*3.0*	.34	40.00	33.83	18.2
2975	Miller's Corn Fertilizer	---	----	2.04	2.04	*1.4*	5.15	4.06	1.06	10.27	*7.5*	9.21	*6.5*	4.14	*3.0*	.34	32.00	26·74	19.6
2836	Baker's Comp. Corn Manure	----	3.49	.73	4 22	*4.9*	5.97	1.26	.18	7.41	----	7.23	*6.3*	9.17	*7.0*	7.02	41.00	34.15	20.1
2950	Miller's Special Potato Manure	----	3.07	.78	3.85	*3.7*	3.89	3.08	.92	7.89	----	6.97	*8.5*	7.88	*7.0*	.37	41.00	33.79	21.3
2759	Mapes' Potato Manure	1.46	.85	1.60	3.91	*3.7*	3.90	4.32	2.54	10.76	*8.0*	8.22	*8.0*	7.32	*6.0*	.57	43.00	35.36	21.6

* Valuation exceeds cost. † Mixture of chemicals and ground bone, 93 per cent. of which passes holes $\frac{1}{20}$ inch in diameter. ‡ Mixture of chemicals and ground bone, 100 per cent. of which passes holes $\frac{1}{20}$ inch in diameter. § Mixture of chemicals and bone, 30 per cent. of which passes holes $\frac{1}{20}$ inch in diameter.

Analyses of Special Manures Sampled by the Station—*Concluded.*

Station No.	Name or Brand.	Nitrogen.					Phosphoric Acid.							Potash.					
		Nitrogen as Nitrates.	Nitrogen as Ammonia.	Nitrogen, Organic.	Total Nitrogen Found.	Nitrogen Guaranteed.	Soluble.	Reverted.	Insoluble.	Total Found.	Total Guaranteed.	Available. Found.	Available. Guaranteed.	Found.	Guaranteed.	Chlorine.	Cost per Ton.	Valuation per Ton.	Percentage Difference between Cost and Valuation.
2861	Mapes' Tobacco Manure, Wrapper Brand	1.17	3.53	1.42	6.12	*6.2*	1.18	3.05	1.82	6.05	....	4.23	*4.5*	11.43	*10.5*	1.06	$50.00	$41.08	$21.7
2818	Crocker's Ammoniated Wheat and Corn Phosphate	....	.16	2.22	2.38	*2.0*	7.81	2.14	2.08	12.03	..	9.95	*10.0*	1.95	*1.8*	1.92	33.00	26.81	23.1
2840	Bowker's Tobacco Manure	....	1.60	1.87	3.47	*3.3*	7.13	2.13	3.16	12.42	*8.0*	9.26	*7.0*	5.08	*5.0*	.48	42.50	34.22	24.2
2767	Williams & Clark's Potato Manure	.29	....	2.55	2.84	*2.0*	5.41	2.96	1.12	9.49	....	8.37	*8.0*	5.75	*6.0*	3.09	36.00	28.96	24.3
2821	Bradley's Potato Manure	.29	...	2.34	2.63	*2.5*	6.43	2.43	1.50	10.36	*8.0*	8.86	*6.0*	5.87	*5.0*	5.79	36.00	28.91	24.5
2763	Stockbridge Vegetable Manure	1.32	.47	1.62	3.41	*3.3*	6.88	1.83	1.47	10.18	*8.0*	8.71	*7.0*	6.73	*5.0*	4.20	40.00	31.98	25.1
2842	Bradley's Complete Manure for Corn and Grain	.31	1.00	1.98	3.29	*3.3*	7.47	2.38	1.31	11.16	*10.0*	9.85	*8.0*	5.02	*4.5*	5.27	40.00	31.86	25.5
2764	Quinnipiac Potato Manure	.35	....	2.75	3.10	*2.5*	4.00	3.82	1.24	9.06	*5.0*	7.82	*5.0*	5.40	*5.0*	.96	37.00	29.35	26.0
2816	E. Frank Coe's Potato Manure	....	.66	1.64	2.30	*2.0*	7.49	1.69	1.40	10.58	*8.0*	9.18	*8.0*	5.69	*6.0*	.34	38.00	29.89	27.1
2826	Great Eastern Vegetable, Vine and Tobacco Fertilizer	....	....	2.14	2.14	*2.1*	7.04	1.92	1.20	10.16	....	8.96	*8.0*	5.97	*6.0*	5.69	35.00	27.52	27.2
2834	Reese's Concentrated Potato and Corn Manure	.37	....	2.62	2.99	*2.7*	3.36	4.73	3.14	11.23	*7.0*	8.09	*6.0*	6.95	*7.5*	7.06	39.00	30.61	27.4
2897	Stockbridge Fruit Manure	.64	....	1.79	2.43	*2.5*	7.31	2.46	2.77	12.54	*7.0*	9.77	*6.0*	5.38	*4.0*	.62	40.00	31.21	28.2
2814	Stockbridge Corn and Grain Manure	.81	....	2.46	3.27	*3.2*	6.50	2.66	3.07	12.23	*10.0*	9.16	*8.0*	4.17	*4.0*	3.06	40.00	30.73	30.2
2817	Crocker's Potato, Hop and Tobacco Phosphate	....	....	2.07	2.07	*2.0*	8.40	1.73	1.29	11.42	*8.0*	10.13	*8.0*	4.19	*3.5*	3.70	36.00	27.63	30.3
2853	Great Eastern General Fertilizer for Grass and Grain.	....	....	2.80	2.80	*2.9*	7.06	1.69	1.27	10.02	....	8.75	*8.0*	2.43	*2.0*	2.86	35.00	26.31	33.0
2878	Davidge Potato Manure	1.11	....	1.81	2.92	*2.9*	6.75	3.16	1.28	11.19	....	9.91	*9.0*	4.23	*4.0*	4.48	40.00	29.50	35.6
2881	Stearns' Potato Grower	....	.65	1.36	2.01	*2.5*	4.14	2.06	2.46	8.66	*5.0*	6.20	...	5.34	*5.0*	.62	34.00	24.20	40.5

Home-Mixed Fertilizers.

Following are analyses of all the samples of Home-Mixed Fertilizers which have been sent to the Station this year, with such facts as could be obtained regarding their cost, etc. The formulas by which the fertilizers were mixed are first given, followed by the table of analyses and valuations, with some explanations and further remarks.

2703. Phosphate made by Lawrence Doyle, Harwinton. This was mixed last year, but the formula by which it was prepared was mislaid and cannot be given.

2742. Mixture for corn, made by Dennis Fenn, Milford.

Formula.

500	pounds	Ground Bone,	costing	$8.25
200	"	Muriate of Potash,	"	4.25
100	"	Sulphate of Potash,	"	1.50
500	"	Dissolved Bone Black,	"	6.50
350	"	Tankage,	"	6.13
500	"	Nitrate of Soda,	"	12.50
2150				$39.13

Cost of Materials, $36.40 per ton.

2744. Mixture for Potatoes. Made by Dennis Fenn, Milford.

Formula.

200	pounds	Muriate of Potash,	costing	$ 4.26
300	"	Sulphate of Potash,	"	4.50
750	"	Tankage,	"	13.12
350	"	Nitrate of Soda,	"	8.75
500	"	Dissolved Bone Black,	"	6.50
2100				$37.13

Cost of Materials, $35.36 per ton delivered at Milford.

2745. Mixture for Corn, etc. Made by W. L. & S. T. Merwin, Milford.

Formula.

1668	pounds	Dissolved Bone Black,	costing	$21.68
1334	"	Tankage,	"	23.34
334	"	Muriate of Potash,	"	7.09
668	"	Sulphate of Potash,	"	10.02
333	"	Sulphate of Ammonia,	"	12.48
500	"	Fine Ground Bone,	"	8.25
4837				$82.86

Cost of materials $34.26 per ton delivered at Milford.

2746. Mixture for Potatoes, etc. Made by W. L. & S. T. Merwin, Milford.

FORMULA.

1668	pounds	Dissolved Bone Black,	costing	$21.68
1534	"	Tankage,	"	26.84
334	"	Muriate of Potash,	"	7.09
668	"	Sulphate of Potash,	"	10.02
333	"	Sulphate of Ammonia,	"	12.48
4537				$78.11

Cost of materials $34.43 per ton delivered at Milford.

2737. Mixture for Turnips and Grass. Made by W. L. & S. T. Merwin, Milford.

FORMULA.

800	pounds	Dissolved Bone Black,	costing	$10.40
400	"	Tankage,	"	7.00
600	"	Sulphate of Potash,	"	9.00
150	"	Sulphate of Ammonia,	"	5.62
300	"	Nitrate of Soda,	"	7.50
250	"	Fine Ground Bone,	"	4.12
2500				$43.64

Cost of materials $34.92 per ton delivered at Milford.

2743. Mixture for Potatoes. Made by G. F. Platt, Milford.

FORMULA.

800	pounds	Blood, Bone and Meat,	costing	$14.00
400	"	Bone,	"	6.60
550	"	Dissolved Bone Black,	"	7.15
50	"	Sulphate of Ammonia,	"	1.87
50	"	Nitrate of Soda,	"	1.25
100	"	Sulphate of Potash,	"	1.50
50	"	Muriate of Potash,	"	1.06
2000				$33.43

Cost of materials $33.43 per ton delivered at Milford.

2738. Mixture made by N. D. Platt, Milford.

FORMULA.

1333	pounds	Tankage,	costing	$23.32
1333	"	Bone Black,	"	17.33
333	"	Ground Bone,	"	5.50
333	"	Sulphate of Ammonia,	"	12.50
333	"	Muriate of Potash,	"	7.08
333	"	Sulphate of Potash,	"	5.00
3998				$70.73

Cost of materials $35.36 per ton delivered at Milford.

2747. Mixture for General Use. Made by R. M. Treat, Woodmont.

FORMULA.

450	pounds	Tankage,	costing	$ 7.88
170	"	Sulphate of Ammonia,	"	6.38
1000	"	Dissolved Bone Black,	"	13.00
280	"	Muriate of Potash,	"	5.95
100	"	Bone,	"	1.65
2000				$34.86

Cost of materials $34.86 per ton delivered at Milford.

Nos. **2703** and **2737** were sampled by private individuals, all the others by a Station agent.

The raw materials from which these mixtures were prepared were analyzed, and knowing their composition and the quantity of each which was used, the composition of the mixtures can be calculated, assuming that all weights were correctly taken, that the materials had not lost or gained moisture and that both mixing and sampling had been thorough. These calculated analyses are given in the table to compare with the actual composition of the mixtures. The agreement of the calculated with the actual composition is not as close as it would have been had the mixing been thorough and the weights correct. In all cases the valuation is lower than if the formula had been exactly followed.

The mechanical condition of these mixtures is good and their chemical composition corresponds with that of the high grade "special fertilizers" and ammoniated superphosphates.

The cost above given is in every case based on the regular cash ton prices of the trade. The *actual* cost in many, if not all, of these cases has been very considerably reduced by special rates

which are given where a number of farmers give a cash order for a car lot or more.

The average cost of materials in these home mixed fertilizers has been $34.23 per ton delivered at the purchaser's freight station. Two dollars will fully cover the cost of screening and mixing. [From a dollar to a dollar and a half is the estimate of those who have done the work.] *At the highest estimate*, therefore, the average cost of these home-mixed fertilizers has been $36.23 per ton. The average valuation has been $34.85 per ton. On the basis of these figures the average difference between cost and valuation has been less than 6 per cent. In factory-mixed goods it has averaged in round numbers 18 per cent.

The attention of those who plan to try home-mixing is called to the following particulars :

1. Nitrogen has come highest this season in ammonia salts, about 18 cents per pound ; in nitrates it has cost from 15 1-2 to 16 1-2 cents per pound. Nitrogen in Castor Pomace has cost about the same. Cotton seed meal remains the cheapest source of quickly available nitrogen which it has furnished at 12 to 14 cents per pound. In one case adulterated Cotton seed meal has been found in the Conn. market. See page 25.

2. At present the superphosphate used in home-mixtures is dissolved bone-black, but soluble phosphoric acid can be bought considerably cheaper in dissolved South Carolina rock.

Besides superphosphates there are other sources of phosphoric acid which should be considered. On some soils, Thomas-Slag has given as good results as superphosphates, and there are other native phosphates in which the ratio between cost and agricultural value may be for some soils and crops as favorable as in superphosphates. Fine ground bone too, which contains from 24–30 per cent. of phosphoric acid and from 1.5–4.0 per cent. of nitrogen can be got for from $26–32 per ton ; while bone-black superphosphate, containing 17 per cent. of phosphoric acid and a small fraction of 1 per cent. of nitrogen costs $26. Attention is also called to the precipitated phosphate mentioned on page 27. Its mechanical condition is excellent and it supplies readily available phosphoric acid at a low price.

3. Potash in sulphates costs about 6 cents per pound, in muriate from 4 to 4 1-2 cents. Kainit contains large quantities of chlorine and should be regarded as an impure muriate rather than as a sulphate. Potash in kainit costs at retail more than in muriate, about 4.8 cents per pound. As may be seen on page 68, potash as a carbonate and perhaps phosphate, has averaged 5.4 cents per pound in cotton-hull ashes. At the lower figure they are an excellent source of potash. The only objection to their use is the great variation in quality. As a result of this the buyer can have no certainty regarding them without a chemical analysis.

Home Mixed Fertilizers.—Analyses and Valuations.

Station No.	Name.	Nitrogen.					Phosphoric Acid.					Potash.		Chlorine.	Valuation per Ton.	Cost per Ton.
		As Nitrates.	As Ammonia.	Organic.	Total. Found.	Total. Calculated	Soluble.	Reverted.	Insoluble.	Total. Found.	Total. Calculated.	Found.	Calculated			
2703	Lawrence Doyle, Home Mixture	----	----	3.27	3.27	----	5.15	1.53	.24	6.92	----	7.92	---	----	$31.30	$32.00
2742	Dennis Fenn, Mixture for Corn	3.44	----	1.79	5.23	*5.4*	5.57	4.88	1.38	11.83	*13.0*	4.00	*5.9*	2.17	37.06	36.40
2744	Dennis Fenn, Mixture for Potatoes	2.49	----	1.87	4.36	*4.5*	4.32	3.32	.70	8.34	*11.1*	6.71	*8.7*	2.77	32.84	35.36
2745	W. L. & C. T. Merwin, Mixture for Corn	----	1.51	2.47	3.98	*4.0*	6.05	3.00	.81	9.86	*10.9*	7.42	*7.0*	3.89	35.55	34.26
2746	W. L. & C. T. Merwin, Mixture for Potatoes	----	1.35	1.75	3.10	*4.3*	6.35	3.73	1.50	11.58	*9.3*	6.75	*7.5*	3.61	33.86	34.43
2737	W. L. & C. T. Merwin, Mixture for Turnips and Grass	1.78	1.29	1.49	4.56	*4.8*	6.38	2.11	1.83	10.32	*9.4*	5.64	*6.2*	----	35.63	34.92
2743	G. F. Platt, Mixture for Potatoes	.37	.58	3.56	4.51	*4.9*	4.97	6.07	3.03	14.07	*13.3*	2.30	*2.5*	1.33	36.25	33.43
2738	N. D. Platt, Home Mixture	----	1.75	2.79	4.54	*3.7*	5.37	3.36	2.46	11.19	*14.3*	5.54	*6.4*	3.34	35.87	35.36
2747	R. M. Treat, Mixture for General Use	----	1.80	1.66	3.46	*3.1*	9.25	1.55	.36	11.16	*14.2*	8.19	*7.2*	6.87	35.28	34.86

Analyses of Cotton Hull Ashes.

Station No.	Dealer or Purchaser.	Sampled by	Soluble Phosphoric Acid.	"Reverted" Phosphoric Acid.	Insoluble Phosphoric Acid.	Potash soluble in water.	Cost per Ton.	Valuation per Ton.	Potash costs per pound in cents.
2643	R. E. Pinney, Suffield	C. H. Wells, Suffield	.46	6.84	.99	19.36	$33.00	$34.62	*5.6*
2652	C. L. Spencer, Suffield	F. C. Root, Suffield	.40	6.68	1.24	22.79	35.00	38.51	*5.2*
2657	R. A. Parker, Warehouse Point	John Mason, Warehouse Point	.64	5.14	1.17	20.00	35.00	33.20	*6.4*
2660	R. A. Parker, Warehouse Point	A. Z. Fowler, Warehouse Point	2.08	7.58	1.09	22.81	35.00	42.50	*4.4*
2661	F. W. Mack, Windsor	H. S. Frye, Poquonock	2.94	7.74	1.95	25.69	30.00	47.91	*2.5*
2671	C. L. Spencer, Suffield	W. H. Prout, Suffield	.54	8.07	1.33	19.07	35.00	36.37	*5.6*
2713	R. A. Parker, Warehouse Point	E. F. Thompson, Warehouse Point	1.23	6.28	2.40	25.28	35.00	42.68	*4.5*
2718	Allen Wilson, Suffield	Arthur Sikes, Suffield	1.10	4.80	4.81	21.10	34.00	36.20	*5.5*
2717	C. L. Spencer, Suffield	Allen Wilson, Suffield	.70	5.09	2.77	17.81	35.00	31.23	*7.0*
2731	Olds & Whipple, Hartford	Olin Wheeler, Buckland	1.62	7.24	1.89	30.24	35.00	50.50	*3.4*
2740	Olds & Whipple, Hartford	E. P. Brewer, Silver Lane	.72	6.16	.28	29.86	35.00	46.33	*4.1*
2757	H. A. Sheldon, West Suffield	F. C. Root, Suffield	.16	4 85	1 55	15.57	35.00	26.83	*8.6*
2862	Sold by H K. Brainard, Thompsonville	Station Agent	2.22	5.87	2.40	23.37	33.00	41.37	*3.5*
2863	Frank Culver, West Suffield	F. C. Root, Suffield	.17	4.61	2.13	14.16	35.00	25.03	*9.5*
2865	C. L. Spencer, Suffield	F. C. Root, Suffield	.80	3.02	7.58	23.39	35.00	36.91	*5.6*
2866	C. L. Spencer, Suffield	J. E. Hastings, West Suffield	.70	7.49	2.30	22.62	35.00	40.43	*4.8*
2867	C. L. Spencer, Suffield	A. J. Easton, Suffield	.22	4.89	1.72	22.24	35.00	35.07	*6.0*
2868	Allen Wilson, Suffield	Arthur Sikes, Suffield	1.71	7.63	1.70	17.56	35.00	35.94	*5.7*
2869	Allen Wilson, Suffield	Arthur Sikes, Suffield	1.01	4.83	3.42	22.16	35.00	36.83	*5.6*
2870	H. N. Loomis, West Suffield	F. C. Root, Suffield	.26	5.66	2.06	19.96	35.00	33.69	*6.3*
2888	C. L. Spencer, Suffield	J. H. Ford, Suffield	.21	7.27	1.77	25.73	35.00	43.18	*4.4*
2906	Olds & Whipple, Hartford	Station Agent	1.44	6.30	.54	33.49	35 00	52.16	*3.5*
2867	James Van Gelder, Suffield	F. C. Root, Suffield	trace	5.37	1.83	15.04	35.00	26.83	*8.7*
2969	Dudley Webster, West Suffield	F. C. Root, Suffield	.64	8.61	.56	23.22	35.00	42.03	*4.5*
3058	J. E. Soper & Co., Boston, Mass.	H. S. Frye, Poquonock	trace	7 69	.43	25.24	30.00	42.00	*3.6*

Miscellaneous Fertilizers and Manures.

Cotton-Hull Ashes.

In the table on the preceding page, are tabulated 25 analyses of Cotton-Hull Ashes analyzed during the present year. It will be seen that the highest percentage of potash in these samples is 33.49, the lowest 14.16, and the average 22.3 per cent. The actual cost of potash per pound (valuing the water-soluble and and citrate-soluble phosphoric acid at 8 and $7\frac{1}{2}$ cents per pound respectively, and insoluble phosphoric acid at 2 cents) has ranged from $9\frac{1}{2}$ cents to $2\frac{1}{2}$ cents, or 5.4 cents per pound on the average, or about half a cent per pound less than it costs in sulphate of potash.

Only potash soluble in water is determined in the analyses. That insoluble in water has little immediate value.

A complete analysis of Cotton-Hull Ashes is here given, which shows the state of the different ingredients as regards solubility.

Cotton-Hull Ashes.—*Complete Analysis.*

	Soluble in in water.	Insoluble in water.	Total.
Potash (K_2O)	25.20	2.65	27.85
Soda (Na_2O)	.50	.80	1.30
Lime (CaO)	none	5.23	5.23
Magnesia (MgO)	.20	11.04	11.24
Oxide of iron and alumina	none	1.64	1.64
Phosphoric acid (P_2O_5)	1.52	8.29	9.81
Sulphuric acid (SO_3)	2.32	0.09	2.41
Carbonic acid (CO_2)	8.28	3.31	11.59
Chlorine	.21	none	.21
Silica and sand	.16	9.34	9.50
		water and charcoal	19.27
	38.39	42.39	100.05
Deduct chlorine equivalent to oxygen			.05
			100.00

Wood Ashes.

2692. Ashes from hard wood. Sampled and sent by D. Fenn, Milford.

2736. Canada Ashes. Sampled and sent by W. H. Burr, Westport, from a lot bought by him of J. B. Nash, Westport, for $11.50 per ton.

2850. Screened Canada Ashes. Sampled by Station Agent from stock of C. S. Gillette, Cheshire. Price $11.00 per ton.

2935. Ashes from stock bought by T. R. Dawley, Griswold, of Ezra Chazy, Baltic, for 20 cents per bushel. Sampled and sent by Station Agent.

2715. Damp Wood Ashes from the Coe Brass Mfg. Co., Torrington. Sampled and sent by C. H. Eno, Simsbury. They contain 15.3 per cent. of water.

3010. Screened Wood Ashes from James Hartness Soap Co., Detroit, Mich. Sampled and sent by N. S. Platt, Cheshire, from stock purchased by him. Guaranteed to contain 5 per cent. of potash.

ANALYSES.

	2692	2736	2850	2935	2715	3010
Potash, soluble in water	4.50	3.69	3.71	4.30	1.96	4.40*
Phosphoric acid	2.70	1.61	1.45	2.32	2.09	1.63

* Total potash 5.27.

The unleached ashes which are in market now are of considerably poorer quality than they were in former years.

LIME KILN ASHES.

2076. Sampled and sent by D. E. Peck, Whigville.

Water	19.54
Carbonate of lime	49.00
Lime chiefly as hydrate	4.11
Phosphoric acid	.49
Potash	.48
Coal and other matters by difference	26.38
	100.00

LIMESTONE.

2970. White with crystalline structure, **2971** gray, from Canaan.

ANALYSES.	2970	2971
Insoluble in acids	.15	.48
Oxide of iron and alumina	----	.20
Lime	56.02	31.31
Magnesia	----	21.03
Carbonic acid by difference	43.83	46.98
	100.00	100.00

2970 is practically pure carbonate of lime, the mineral calcite. **2971** is a mixture of carbonate of lime and carbonate of magnesia, the mineral dolomite.

Land Plaster.

2806. Nova Scotia Plaster, sent by Robt. Aitkin, Shaker Station.

2887. Cayuga Plaster sent by E. P. Halley & Co., Coscob.

Analyses.	2806	2887
Pure hydrated sulphate of lime	96.99	65.40
Carbonate of lime	2.27	27.27
Other matters by difference	.74	7.33
	100.00	100.00

Tank Water and Settlings.

2712. Water in which bones have been boiled to remove grease. Sent by C. A. Sanderson, Moodus.

2704. Waste Scouring Solution from wool scouring works.

2705. Sediment from Tanks in which wool is scoured. Both sent by J. A. Bill, Lyme.

Analyses.

	2712	2704	2705
Water	----	----	32.33
Sand	----	----	50.78
Organic matter	----	.55	6.72
Nitrogen	1.14	.02	.14
Phosphoric acid	----	trace	.15
Potash	----	.16	.69

Wool Waste.

2968. A sample of Wool Waste sent to the Station by some one in the State, whose name and address have been mislaid, thus making a report to him impossible when the analysis was completed, contained

Nitrogen as ammonia	.38
Nitrogen, organic	6.75
Total nitrogen	7.13
Phosphoric acid	.14
Potash	.14

Some forms of wool waste have proved to be valuable as nitrogenous manures and others are quite inert. This material was damp and seemed to be already rotting, so that it may be presumed that the nitrogen in it was becoming available.

Farm Manure.

2754. Cow Manure. From milk cows fed on hay and stover, —one feed of each per day—corn meal, wheat bran and a moderate quantity of brewers' grains. The manure was kept closely packed in a manure house having a cement floor.

2755. Hog manure from swine fed on garbage and corn meal. Manure exposed to the weather in the sties. The extraordinary quantity of phosphoric acid in the manure comes from the bone contained in the garbage.

Samples of both these manures were drawn by an officer of the Station with all possible care. The manure was from a lot used in field experiments at the farm of J. H. Webb, Esq., Hamden, and will be again referred to in the discussion of field experiments.

Analyses.

	Cow Manure.	Hog Manure.
	2754	**2755**
Water	82.42	65.23
Organic and volatile matters	15.33	25.73
Ash	2.27	9.04
	100.00	100.00
Contained in the Ash:		
Potash	.300	.102
Soda	.114	.111
Lime	.280	1.476
Magnesia	.121	.119
Oxide of iron and alumina	.063	.488
Phosphoric acid	.204	.808
Sulphuric acid	.075	.171
Chlorine	.123	.054
Sand and silica	.990	5.711
	2.270	9.040
Contained in the organic and volatile matters:		
Nitrogen as ammonia	.10	.02
Organic nitrogen	.32	.56
Total nitrogen	.42	.58

Rockweed and Sponge.

Some species of marine plants are more or less used on the coast as fertilizers, and are thought much of for corn land; particularly the "round-stalked rockweed" and "flat-stalked rockweed," for which farmers sometimes pay 5 cents per bushel in its green state as it is cut from the rocks at low tide. It is plowed

under green, and is popularly believed to lose much of its value if allowed to dry before turning under.

Analyses of several species have been made, the samples being supplied by Mr. Walter Merwin, of Milford, March 24.

2724. Round Stalked Rock-Weed. *Ascophyllum nodosum.*
2725. Flat Stalked Rock-Weed. *Fucus vesciculosus.*
2726. A coarse Sponge. Species not determined.
2727. A finely branching Sea Weed. Species not determined.
2728. "Irish Moss." *Chondrus crispus.*

ANALYSES.

	Rockweed round-stalked.	Rockweed flat-stalked.	Sponge.	Sea Weed.	Iceland Moss.
	2724	**2725**	**2726**	**2727**	**2728**
Water	82.71	84.34	86.13	81.39	80.84
Organic and volatile matters	13.52	12.09	5.46	12.72	14.43
Pure ash	3.97	3.57	8.41	5.89	4.73
	100.00	100.00	100.00	100.00	100.00
The organic matter contains nitrogen,	.53	.48	.58	.73	.77
The ash consists of—					
Potash	.61	.54	.16	1.30	1.00
Soda	.90	.85	.72	.58	
Lime	.30	.27	.08	.23	
Magnesia	.24	.23	.14	.18	
Oxide of iron and alumina	.01	.02	.23	.12	
Phosphoric acid	.10	.09	.14	.18	.17
Sulphuric acid	.82	.67	.17	.84	
Chlorine	.80	.82	.77	.96	
Sand and silica	.12	.16	6.17	1.72	.54
Other matters by difference	.05	.10	----	----	
	3.95	3.75	8.58	6.11	
Deduct oxygen equivalent to chlorine,	.18	.18	.17	.22	
	3.77	3.57	8.41	5.89	

The analyses show as large a percentage of nitrogen in all the samples as is contained in good stable manure, but less phosphoric acid. The "rock weeds" have as much potash, and the fine seaweed and Irish moss a good deal more than ordinary stable manure. In the opinion of those who use rock-weed, fresh, it is as quick in its action as stable manure. Some maintain that Rockweed gathered in the fall is best. Others prefer the spring-crop.

No attempt was made to determine the small quantity of iodine which the samples probably contain. With the volatile matter is included a portion of the sulphur which the seaweeds contain in considerable quantity.

Direct determinations of total sulphur made in samples Nos. **2724** and **2725** gave .43 and .34 per cent. respectively of sulphur in the fresh substance.

Pigeon Manure.

2649. A dry sample, containing very little foreign matter, feathers, straw, etc. Sampled and sent by A. D. Cooke, Hartford.

Analysis.

Water	9.55
Organic and volatile matters*	62.38
Potash	1.07
Soda	.65
Lime	2.12
Magnesia	.79
Oxide of iron and alumina	1.08
Phosphoric acid	1.83
Sulphuric acid	.57
Chlorine	.47
Sand and silica	18.12
Carbonic acid and undetermined	1.37
	100.00
* Containing nitrogen as ammonia	.47
Organic nitrogen	3.43
Total nitrogen	3.90

This material contains as much or more nitrogen than most commercial fertilizers, besides 1 per cent. of potash and 1.8 per cent. of phosphoric acid. The "dung" of fowls contains not only the undigested food, but also, in solid form, the excretions of the kidneys, which in cattle are voided as urine, and are apt to be lost, both by drainage and by rapid fermentation. This, the richer food, and the fact that the dung of fowls is comparatively dry, explain the higher percentage of nitrogen, phosphoric acid and potash in it.

REVIEW OF THE FERTILIZER MARKET.

For the Twelve Months ending Dec. 31, 1890.

Nitrogen.

Nitric Nitrogen.

The *wholesale* quotation of nitrogen in nitrate of soda has fallen very decidedly during the year. The average price during the first five months of 1889 was 16.1 cents per pound, for the

same period in 1890 the average price was 11.9 cents. In December, 1890, it was quoted at 11.2 cents per pound. See monthly quotations on page 79.

The *retail* price of nitrogen in nitrate of soda in this State during the last season has been about 16 cents per pound.

Ammonic Nitrogen.

The *wholesale* price of nitrogen in sulphate of ammonia was about a cent lower per pound during the first five months of 1890 than during the same period in 1889. But from July on, the wholesale price in 1890 has ruled about a cent higher in 1890 than in 1889. This has been caused in part by the unusual demand for ammonia for ice-machines during the last summer. The wholesale price of nitrogen in this form in December, 1890, was 16½ cents per pound. See monthly quotations on page 79.

The *retail* price of nitrogen in sulphate of ammonia in this State the past year has been about 18 cents per pound.

Organic Nitrogen.

The wholesale price of nitrogen in Dried Blood has also been decidedly lower in 1890 than in the previous year. Thus for the first five months of 1889 the average *wholesale* price of nitrogen in blood was 16.1 cents per pound; for the same months in 1890, 11.9 cents per pound. It was quoted in December last as 11.2 cents. The monthly quotations are given on page 79. Very little dried blood has been retailed in Connecticut the past year.

The wholesale quotations of nitrogen in Azotin have followed the same changes as in Blood, always being a fraction of a cent higher.

Dried Fish Scrap, which is considerably used in mixed fertilizers, was quoted in January, 1889, at $22.50 per ton, but has steadily fallen to $19.25.

As has been already noticed in this report, nitrogen has retailed in this State the past year at 15.5 cents per pound in Blood, from 15.6 to 16.8 cents in Castor Pomace and from 11.7 to 13.8 cents per pound in Cotton Seed Meal. Cotton Seed Meal still remains the cheapest source of available organic nitrogen.

Phosphatic Materials.

Refuse Bone Black, quoted at the beginning of the year at $19.45 per ton wholesale fell to $18.50 in September at which price it is still quoted.

Rough and Ground Bone have been quoted at $21.50 and $26.50 per ton wholesale through the whole year.

Ground Charleston Rock, quoted at wholesale in January at $11.25 per ton fell to $10.65 in July, $9.75 in August and has been quoted at the same figure ever since.

Acid Phosphate, containing 14 per cent. available phosphoric acid, was quoted at 81¼ cents per unit, equivalent to 4.06 cents per pound for available phosphoric acid, in January. It fell in July to 73¾, equivalent to 3.7 cents per pound for available phosphoric acid, and is still quoted at that price.

Potash.

Muriate of Potash.

The wholesale quotations of this article show smaller fluctuations than those of any other commonly used fertilizer. They have varied between 3.55 cents per pound for actual potash in December last and 3.64 cents per pound, the quotation during all the earlier part of the year.

Actual potash in the form of muriate has been retailed in Connecticut at about 4.2 to 4.4 cents per pound.

Double Sulphate of Potash and Magnesia.

The wholesale quotation remained steady at 4.42–4.44 cents per pound for actual potash till November, when it fell to 4.27 and in December rose to 4.53.

The retail price in Connecticut this year has been a little less than 6 cents per pound.

High-Grade Sulphate of Potash.

This material contains about the same per cent. of potash as the muriate but is almost entirely free from chlorine. The wholesale quotation made actual potash cost 4.77 cents per pound from January to September. Under the new tariff law it is imported duty-free, and in consequence the price fell to 4.17 cents in October, and 4.06 cents in November. In December it rose again to 4.31. It has not been retailed in Connecticut during the past season.

Kainit.

The wholesale price of Kainit rose from $10.70 per ton in January to $11.00 in April, fell to $10.37½ in July, remained steady till December and then fell to $10.00.

In general nitrogen in blood, azotin, nitrate of soda and fish scrap has fallen decidedly in price during the year. The nitrogen of sulphate of ammonia has, on the other hand, risen considerably.

Charleston Rock is considerably lower, Bone Black somewhat lower, Bone has remained constant through the year.

Acid phosphate made from South Carolina rock is considerably lower than at the opening of the year.

Muriate of Potash, Double Manure Salt and Kainit are quoted about as they have been through the year, but high-grade sulphate is very considerably lower.

The market quotations given above are taken from the "Oil Paint and Drug Reporter," published in New York. The weekly quotations for each month are averaged, and this average is taken as the quotation for the month.

The following explanations will help in the examination of the market quotations, and will also show the basis on which they have been interpreted in this review:

Phosphate rock, *kainit*, *bone*, *fish-scrap*, *tankage*, and some other articles are quoted and sold by the ton. The seller usually has an analysis of his stock and purchasers often control this by an analysis at the time of purchase.

Sulphate of ammonia, *nitrate of soda and muriate of potash* are quoted and sold by the pound, and generally their wholesale and retail rates do not differ very widely.

Blood, *azotin and ammonite* are quoted at so much "per unit of ammonia." To reduce ammonia to nitrogen, multiply the per cent. of ammonia by the decimal .824 (or multiply the percentage of ammonia by 14 and divide that product by 17). A "unit of ammonia" is one per cent., or 20 pounds per ton. To illustrate: if a lot of tankage has 7.0 per cent. of nitrogen, equivalent to 8.5 per cent. of ammonia, it is said to contain 8½ units of ammonia, and if quoted at $2.25 per unit, a ton of it will cost 8½ × 2.25 = $19.13.

The term "ammonia" is *properly* used only in those cases where the nitrogen actually exists in the form of ammonia, but it is a usage of the trade to reckon all nitrogen, in whatever form it occurs, as ammonia.

To facilitate finding the actual cost of nitrogen per pound from the cost per unit of ammonia in the market reports, the following table is given :

Ammonia at	$3.00	per unit is	equivalent to	nitrogen at	18.2	cts. per lb.
"	2.90	"	"	"	17.6	"
"	2.80	"	"	"	17.0	"
"	2.70	"	"	"	16.4	"
"	2.60	"	"	"	15.8	"
"	2.50	"	"	"	15.2	"
"	2.40	"	"	"	14.6	"
"	2.30	"	"	"	14.0	"
"	2.20	"	"	"	13.4	"
"	2.10	"	"	"	12.8	"
"	2.00	"	"	"	12.2	"
"	1.90	"	"	"	11.6	"
"	1.80	"	"	"	11.0	"

Commercial Sulphate of Ammonia contains on the average 20.5 per cent. of nitrogen, though it varies considerably in quality. With that per cent of nitrogen (equivalent to 24.3 per cent. of ammonia).

At	4	cents per lb.	Nitrogen	costs	19.5	cents per lb.
"	$3\frac{7}{8}$	"	"	"	18.9	"
"	$3\frac{3}{4}$	"	"	"	18.3	"
"	$3\frac{5}{8}$	"	"	"	17.6	"
"	$3\frac{1}{2}$	"	"	"	17.0	"
"	$3\frac{3}{8}$	"	"	"	16.4	"
"	$3\frac{1}{4}$	"	"	"	15.8	"
"	$3\frac{1}{3}$	"	"	"	15.2	"
"	3	"	"	"	14.6	"
"	$2\frac{7}{8}$	"	"	"	14.0	"
"	$2\frac{3}{4}$	"	"	"	13.4	"

Commercial Nitrate of Soda averages 95 per cent. of the pure salt or 15.6 per cent. of nitrogen.

If quoted	at 3	cents per lb.	Nitrogen	costs	19.2	cents per lb.
"	$2\frac{7}{8}$	"	"	"	18.3	"
"	$2\frac{3}{4}$	"	"	"	17.6	"
"	$2\frac{5}{8}$	"	"	"	16.9	"
"	$2\frac{1}{2}$	"	"	"	16.0	"
"	$2\frac{3}{8}$	"	"	"	15.2	"
"	$2\frac{1}{4}$	"	"	"	14.4	"
"	$2\frac{1}{8}$	"	"	"	13.6	"
"	2	"	"	"	12.8	"
"	$1\frac{7}{8}$	"	"	"	12.0	"
"	$1\frac{3}{4}$	"	"	"	11.2	"

Commercial Muriate of Potash and also High Grade, 98 per cent., Sulphate of Potash usually contain $50\frac{1}{2}$ per cent. of actual potash.

If quoted	at 2.60	cents per lb.	Actual Potash	costs	5.15	cents per lb.
"	2.50	"	"	"	4.95	"
"	2.40	"	"	"	4.75	"
"	2.30	"	"	"	4.55	"
"	2.25	"	"	"	4.45	"
"	2.20	"	"	"	4.35	"
"	2.15	"	"	"	4.25	"
"	2.10	"	"	"	4.15	"
"	2.05	"	"	"	4.06	"
"	2.00	"	"	"	3.96	"
"	1.95	"	"	"	3.86	"
"	1.90	"	"	"	3.76	"
"	1.85	"	"	"	3.66	"
"	1.80	"	"	"	3.56	"
"	1.75	"	"	"	3.46	"
"	1.70	"	"	"	3.36	"

The Double Sulphate of Potash and Magnesia has about $26\frac{1}{2}$ per cent. of actual potash.

If quoted	at 1.00	cent per lb.	Actual Potash	costs	3.77	cents per lb.
"	1.05	"	"	"	3.96	"
"	1.10	"	"	"	4.15	"
"	1.15	"	"	"	4.34	"
"	1.20	"	"	"	4.53	"

The following table shows the fluctuations in the wholesale prices of a number of fertilizing materials in the New York market, since July, 1887. The price given for each month is the average of the four weekly quotations in that month. Sulphate of ammonia is assumed to contain 20.5 per cent. and nitrate of soda 15.6 per cent. nitrogen, and muriate of potash $50\frac{1}{2}$ per cent. of actual potash or 80 per cent. of the pure salt.

Wholesale Prices of Fertilizing Materials.

		Cost of Nitrogen at wholesale in				Cost of Potash at wholesale in			
		Blood. Cents per pound.	Azotin or Ammonite. Cents per pound.	Nitrate of Soda. Cents per pound.	Sulphate of Ammonia. Cents per pound.	Muriate of Potash. Cents per pound.	Double Manure Salt, Cents per pound.	High Grade Sulphate of Potash. Cents per pound.	Available Phosphoric Acid in Dissolved South Carolina Rock. Cents per pound.
1887.	July	13.1	14.0	12.0	14.5	3.41	---	---	---
	August	12.6	13.4	11.8	14.5	3.40	---	---	---
	September	12.1	12.5	12.2	14.7	3.36	---	---	---
	October	12.1	12.3	13.0	14.9	3.36	---	---	---
	November	11.8	12.2	12.7	14.7	3.41	---	---	---
	December	12.1	12.3	13.8	14.9	3.46	4.08	---	---
1888.	January	12.2	12.3	13.8	14.9	3.48	4.24	---	---
	February	12.6	12.6	13.3	14.9	3.48	4.49	---	---
	March	13.9	13.6	13.1	14.9	3.46	4.15	---	---
	April	13.9	13.6	12.9	14.9	3.46	4.11	---	---
	May	13.9	13.6	12.8	15.2	3.52	4.24	---	---
	June	14.0	13.6	13.1	14.9	3.50	3.86	---	---
	July	14.2	13.9	13.1	14.9	3.50	3.86	---	---
	August	14.5	14.2	13.2	14.9	3.50	3.86	---	---
	September	14.6	14.2	13.9	15.3	3.71	4.38	---	---
	October	15.0	15.0	14.1	15.8	3.71	4.47	---	---
	November	15.9	16.2	14.6	16.4	3.72	4.48	---	3.89
	December	16.0	16.5	15.2	16.4	3.71	4.53	---	3.89
1889.	January	16.3	16.6	15.1	16.6	3.66	4.63	5.00	4.30
	February	16.5	17.0	15.0	16.6	3.66	4.44	5.01	4.37
	March	16.5	17.1	15.2	16.6	3.66	4.48	4.88	4.20
	April	16.0	16.1	14.6	16.2	3.57	4.44	4.85	4.10
	May	15.1	15.2	13.8	15.7	3.64	4.49	4.65	4.06
	June	14.9	14.6	12.8	15.2	3.64	4.53	4.60	4.06
	July	14.6	14.2	12.5	15.1	3.64	4.53	4.56	4.06
	August	14.6	14.2	11.9	15.0	3.64	4.53	4.56	4.06
	September	13.9	14.2	12.1	15.0	3.64	4.44	4.66	4.06
	October	13.6	13.7	12.2	15.0	3.64	4.44	4.67	4.06
	November	13.2	13.6	12.3	15.4	3.64	4.44	4.75	4.06
	December	12.6	13.3	12 4	15.4	3.64	4.44	4.98	4.06
1890.	January	12.2	12.7	12.1	15.4	3.64	4.44	4.97	4.06
	February	12.1	12.5	12.0	15.4	3.64	4.44	4.97	4.06
	March	11.9	12.2	11.9	15.4	3.64	4.44	4.89	4.06
	April	11.5	12.2	11.2	15.4	3.64	4.42	4.77	4.06
	May	11.6	12.2	11.2	15.3	3.62	4.42	4.77	4.05
	June	11.6	12.1	11.2	15.8	3.62	4.42	4.77	4.00
	July	11.6	12.0	11.2	16.6	3.62	4.42	4.77	3.69
	August	11.3	11.5	11.0	16.6	3.62	4.42	4.77	3.69
	September	11.0	11.3	11.1	16.6	3.62	4.42	4.77	3.69
	October	11.1	11.7	11.6	16.5	3.62	4.42	4.17	3.69
	November	11.2	11.4	11.6	16.5	3.55	4.27	4.06	3.69
	December	11.2	11.4	11.6	16.5	3.62	4.53	4.31	3.69

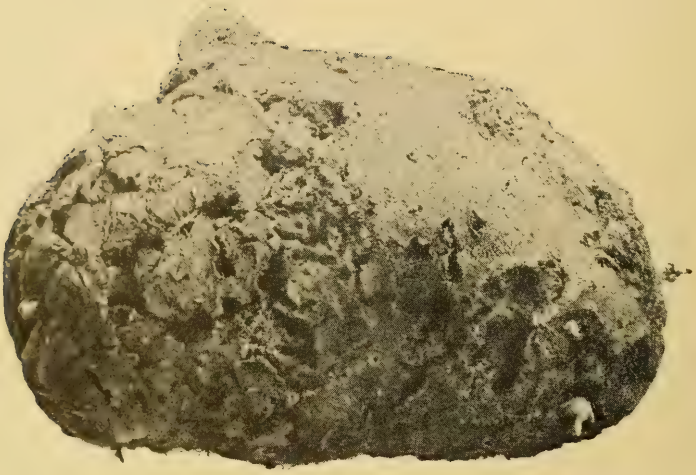
REPORT OF THE MYCOLOGIST,

DR. ROLAND THAXTER.

DURING the past season the injury from fungus diseases was much less than in the previous year owing to the absence of warm damp weather through the early summer, which was more than usually dry and therefore unfavorable for their development. For this reason several experiments which had been planned were necessarily abandoned for lack of material to work with, and the attention of the mycologist has been for the most part divided between further trials of fungicides for the treatment of certain fungus diseases, and an investigation of the "potato scab," which proved of such considerable interest and importance that it has been made the special subject of inquiry during the season. An elaborate experiment in regard to the effect of certain chemicals upon the "onion smut," in continuation of last year's work on the same subject, proved almost valueless owing to the failure of the seed; and further greenhouse experiments do not point to the conclusion that more favorable results, from the sulphur treatment, are to be looked for than were obtained during the season of 1889.

The success which has attended the use of fungicides by the Station has led the writer to give somewhat more specific directions for their preparation and use, as an extension of Bulletin 102 issued by the Station in March, 1890. The importance of the injuries due to fungi and known under such names as blight, rust, mildew, etc., and the fact that many of them are readily remedied does not receive sufficient recognition in the State, which should not be behind other farming communities both in this country and abroad in reaping the benefit of whatever information is obtainable on the subject. The present opportunity is therefore taken again to urge farmers to communicate with this department of the Station, and to furnish information where serious damage is being done to their crops through injuries of the nature just referred to. Attention is called to the photographic reproduction facing p. 99, which shows very well what may be

Fig. 1.



Specimen of ordinary "deep" Scab.

Fig. 2.

"Deep" Scab, induced by inoculation, in form of monogram R. T.

done at small expense to prevent premature defoliation of fruit trees by fungi; and also to the fact that treatment applied to grapes this year has resulted in a difference equivalent to that between a nearly full crop and an almost total failure. Such demonstrations, supported by similar results in various sections of the country, show that farmers can no longer afford to neglect the subject of fungus diseases and their treatment, and it is hoped that greater interest in it may be shown during the coming season and more frequent calls made for information from the Experiment Station.

THE POTATO "SCAB."*

It is a well-known fact that the theories and explanations which have been advanced to account for certain diseased conditions of the surface of potato tubers generally known as "Scab," are nearly as numerous as the experimenters who have studied the disease, but until quite recently no satisfactory demonstration of what the active agent really is which gives rise to the condition, has been advanced; although the subject has occupied scientific investigators from time to time for upwards of half a century.

The recent demonstration just referred to is that of Mr. H. L. Bolley, which was published in Agricultural Science, Vol. IV, p. 243, having been previously presented as a paper at the meeting of the American Association for the Advancement of Science, Aug. 26 of the present year. Mr. Bolley's work was so carefully done and his results appear to be so conclusive in bearing out his statement that the disease originates from the action of a specific bacterium, that the subject might seem exhausted and not open to further investigation. The observations of the writer, however, begun without any knowledge of Mr. Bolley's work, although they do not, as will be seen, disprove the accuracy of his investigations, have nevertheless led to quite different results which seem to show that the question "what is potato 'Scab'" is still a very pertinent one.

It is hardly necessary to remark that the investigation of the writer has been in a great measure preliminary, having been commenced about midsummer of the present year, and is based largely

* The substance of the present notice was presented in a paper by the writer read before the botanical section at the meeting of the Association of Agricultural Colleges and Experiment Stations at Champaign, Ill., Nov. 12, 1890.

on greenhouse cultures, which were necessarily made on a small scale; work upon the subject out of doors not being possible at the time when the organism producing scab had been isolated and obtained pure by artificial cultures in sufficient quantities for inoculations. Experiments of a practical nature, therefore, were not attempted and the main object in view has been to isolate, and if possible to demonstrate what is the active agent in causing the disease investigated. Having, in the writer's opinion at least, succeeded in doing this pretty conclusively, a rational basis is gained for practical experiments which will be undertaken at the Station during the coming year.

The theories which have been previously held concerning the origin or cause of "Scab" may here be briefly alluded to; although for further information on the subject the recent papers of Prof. Humphrey* and Mr. Bolley† should be consulted; the latter especially containing a very full bibliography of the subject.

Among the causes of an inorganic nature which have been said to produce the disease may be mentioned the following: *Excessive moisture* in the soil, supposed to affect the lenticels, which constitute the small rough dots scattered over the surface of normal tubers, producing an abnormal growth of corky tissue at such points, which may extend to the adjacent superficial tissue and be associated with more or less decay. *Mechanical irritation* induced through foreign substances in the soil which may act as a direct irritant to the surface of the tubers; the "Scab" being the result of an attempt to repair the injury through an abnormal corky growth at such points; also accompanied or followed by more or less decay. *Chemical action* due to the presence of certain substances in the soil, such as lime or oxide of iron, which through an irritant action might lead to similar results. *Fertilization* especially by stable manure which has been definitely observed to influence the prevalence of the disease; a fact which has been explained on the supposition that it may furnish conditions favorable for the action of one or more of the supposed causes already enumerated.

It is needless to examine these different theories in detail, since in all cases they lack the confirmation of crucial experiments and are involved and involve each other in a mass of contradictions, with a result of nothing definite in any case. The simple fact

* Report of the Mass. Agr. Exp. Station 1889, p. 131, and 1890, p. 214. † l. c.

that scab occurs very commonly on light dry land entirely free from extraneous material which could produce external irritation, and regardless of lime or other chemical substances in the soil; also that barn manure, not infrequently at least, yields a clean crop, is sufficient to show clearly that none of these supposed causes is in itself sufficient to account for the phenomenon. The best that can be said of them is, that in some cases they may involve conditions favoring the prevalence of the disease; but the question of its cause they leave untouched.

Turning to the theories which connect the "scab" with the action of some organism, vegetable or animal, the "insect" theory is one very commonly entertained, especially by farmers, "insects" including earth worms. This idea is based upon the fact that scab spots form an attractive feeding ground for a variety of insects, especially wire worms, myriapods and mites, the common occurrence of which, especially in the deeper scab spots, has led to the belief that the two were directly associated. That this is not the case has been shown by careful observation, the only connection between the two resting on the fact that the injury already existing from a quite different cause is often extended by them very considerably.

On the botanical side perhaps the earliest explanation of the cause of scab is that of Dr. Wallroth,* who in 1842 attributed it to the action of a fungus which he called *Erisybe subterranea.* This fungus, however, which is a conspicuous form and very readily recognized, is now known to have no connection with the ordinary forms of scab and has not even been found in this country. The disease which it produces, although having some resemblance to scab in its earlier stages, is yet quite distinct and peculiar, and is more properly known as "smut" of potatoes; the fungus developing in the diseased tubers beneath the skin, which finally cracks, liberating a powdery greenish mass of large, multicellular spores. The same thing appears to have been described and figured as "*Protomyces*" by Martius,† by Berkeley ‡ as *Tubercinia scabies*, and distributed, according to Smith,§ by Rabenhorst as *Rhizosporium solani.* It was placed in the genus *Sorosporium* by Fischer de Waldheim‖ under the name *S. scabies*

* Linnæa, 1842, p. 332.

† De Aardappel-Epidemie etc. Genootsch. v. Landb. en Kruidk. t. Utrecht, 1843.

‡ Jour. Roy. Hort. Soc., vol. 1, 1846, p. 33, fig. 30–31 [Sec. Smith].

§ Diseases of Field and Garden Crops, p. 35.

‖ Aperçu System d. Ustilagineés, 1877, p. 33.

and is there retained by Saccardo,* although Dr. Wallroth's name would appear to be the oldest.

Beyond general allusions to a possible fungus origin this so-called smut is apparently the only true fungus which has been in any way suggested as a cause of any scab-like disease of potato tubers. Within a few years, however, Dr. Brunchorst† of Sweden, claims to have shown that a disease of potatoes occurring in that country, which he considers identical with the ordinary and destructive forms of scab, is due to one of the Mycetozoa or slime-fungi, allied to that producing the club root of cabbage. This organism, which he calls *Spongospora solani*, has not been found associated with any American form of the disease ; and Prof. Humphrey is doubtless correct in his opinion, based partly on photographs of diseased tubers sent by Dr. Brunchorst, that the latter's "*skurv*" and our "scab" are quite different diseases.

The most recent contribution concerning the cause of scab from a botanical standpoint is that of Mr. Bolley, already referred to, which embodies the first experimental demonstration of a definite cause of scab that has yet been given. This author shows through careful experiments, by means of inoculations from pure cultures, that the specific agent in his disease is a species of Bacterium which he found always associated with it ; and which when used as a medium for inoculations under proper conditions reproduced the disease in growing tubers. It is to this group of what may be called "vegetable" theories that the writer is constrained to add yet another as a result of his observation and experiments.

General Characteristics of the Disease.—The disease as it occurs in Southern Connecticut, where the writer has had an opportunity of examining it, first shows itself as a minute, reddish or brownish spot on the surface of the tuber, often making its appearance when the latter is very young, and sometimes not until it has reached a considerable size. This discoloration very commonly, though not invariably, has its origin in one of the roughened points, or lenticels, which are scattered over the surface of the potato, and after it has once appeared may extend quite rapidly to the adjacent tissue ; becoming deeper in color and being associated with an abnormal corky development of the parts involved which often cover a considerable area. This area may

* Sylloge, vii, 513.

† Ueber eins uhr. verbr. Krankheit d. Kartoffelknollen. Bergens Museum Aarsberetnung, 1886: p. 217–226. Bergen, 1887.

constitute a more or less irregular scab-like crust over the surface or more frequently may become deeply cracked and furrowed, the depth and extent of the injury depending in a great measure upon the stage at which the tuber first became diseased; those which are attacked while very young showing, as might be expected, by far the most deep seated injury. The presence of bacterial decay together with the growth of various forms of saprophytic fungi, for which such diseased spots form a congenial substratum, serve to extend the injury very considerably, especially when the tubers are left in the ground for some time after maturity. Under such conditions also the work of injury is completed very frequently by various insects, more especially by wire worms, myriapods and mites, which feed upon the decaying portions of the tuber till the cavities may be scraped quite clean down to the sound tissues; so that the surface may present the appearance of a succession of rounded pockets. In severe cases where, however, there has been little extension of the injury by insects the potato presents the appearance figured on Plate I, fig. 1.

The description just given may seem superfluous, the described condition being so familiar; yet it has seemed best to give it in consideration of the uncertainties which are attached to the meaning of the term "scab," partly as a result of the numerous theories held concerning it, and partly on account of actual differences presented by the disease itself.

The attention of the writer was first specially attracted to this subject in July of the present year after examining a number of the tubers in various stages of the disease in question which were brought to the laboratory from the town of Hamden. It was then noticed that the majority of diseased spots on these tubers were associated with the presence of a peculiar grayish mould-like appearance, especially prominent about the edges of the younger spots and frequently discernible without the aid of a hand lens. An attempt was made at the time to transfer a portion of this gray substance to a slide, in order to gain some knowledge of its true character by examining it under the microscope; but the attempt was unsuccessful, the substance seeming to disappear when touched with a needle. Scrapings from the diseased surface, where this film was observed, when placed under the microscope showed nothing characteristic which could be identified as connected with the object sought for, and the same result attended the examination of sections cut from the scab

spots. The subject was then laid aside for a time until, on visiting the field from which the potatoes in question had been brought, it was found that the diseased tubers, which constituted a large percentage of the crop, in almost every case showed the more or less distinct presence of the same grayish material previously observed. In fact it was invariably visible in the younger spots when due care was taken to uncover the potatoes so as to avoid unnecessary friction, and to examine them while still moist. When rubbed against the earth, or when the surface was allowed to become dry, the gray material was often found to have disappeared entirely. Having ascertained that the appearance described was not local in any part of the field, but was present wherever diseased potatoes were examined, a number of the latter on which it was most conspicuous, were placed, while still moist, in a tight tin box where they were left for twenty-four hours or more. At the end of this time the gray growth was found to have greatly increased ; being visible to the naked eye on all the scab spots, and no difficulty was met with in taking enough of it on a needle to make sure of recognizing it under the microscope. It was then found to consist of bacteria-like bodies with a strong tendency to cohere in an amorphous-looking mass, very repellant of water and even to some extent of absolute alcohol. The bodies themselves were rod-like, of various lengths, and among them numerous spirally-coiled forms were peculiar and conspicuous. Pressure on the cover glass, applied to separate the mass, caused it to break up entirely into bacillus-like pieces exactly resembling a group of minute bacteria.

After examining a number of fields affected by the disease in different localities, and finding that this gray organism was its invariable accompaniment when once recognized and sought for, usually visible to the naked eye when due care was taken in removing the tubers from the ground, its isolation and cultivation were undertaken, and by a few transfers it was finally obtained quite pure. The nutrient media used for this purpose were gelatine and agar peptone broths and potato decoctions, sterilized slices of potato being also used for the same purpose. Drop cultures were made in Van Tieghem cells, in which decoctions of horse dung or of potato were used as the nutrient fluids. In all these substances, both fluid and solid, the organism was found to grow with vigor.

General Characters of the Scab fungus when cultivated.—The gross appearance of the cultures on solid media should be noted, since it is quite peculiar and varies considerably according to the substance used. In all cases the growth of the organism when it is in direct contact with the air is accompanied by a peculiar dark stain, although when a culture is made so that the growth takes place wholly within the nutrient medium, little or no discoloration is produced. This stain is very characteristic, and varies considerably in intensity according to the substances used for cultivation. On slices of potato as well as on potato agar or potato gelatine decoction it is very striking—smoky black, almost opaque, and diffuses itself to a considerable distance from the point of growth. On gelatine peptone broth the stain is dark rust brown, while on agar peptone broth it is comparatively pale. As the culture grows old the stain loses its intensity, diffusing evenly through the jelly, which becomes reddish brown and more or less translucent.

In all cases a neutral medium is the best for cultures. Slight alkalinity, and to a less degree slight acidity, appear to retard the growth. This is strikingly shown in liquid cultures made on a large scale, in which also the changes of color are very marked. The connection between the black discoloration and some alkaline product formed by the growth of the fungus seems evident, since both neutral and acid solutions are made alkaline by it after the black discoloration has begun. In the latter case the solution retains its natural yellowish color until its acidity is overcome. Alkaline salts readily impart a brownish color to potato decoction; but it is far less intense than that produced by the fungus, and a solution already thus stained is only slightly changed by the fungus, or changes very slowly.

The gross appearance of the organism itself is also quite peculiar and somewhat variable, being most characteristic on the potato bases. On potato slices it tends to become heaped up so as to form a blackish, viscid-looking, lobulated pustule, without spreading to any great extent over the surface on which it grows. On potato agar it produces a circular, lichenoid, livid brownish growth extending evenly over the surface in all directions, slightly convex, firm and viscous-looking, with scalloped margin and radial and concentric furrows. On agar peptone broth the growth is less convex and less characteristic; in some cases viscid and slightly lichenoid, but usually covered with a white, floccu-

lent stratum which eventually turns grayish, and resembles exactly the grayish film originally found in connection with the scab spots, both in appearance and microscopic characters, and constitutes the "fructification" of the fungus. This fructification may make its appearance at points on any solid culture medium, especially when the latter has become somewhat dry; but potato agar cultures may grow for months without showing any sign of it, the growth remaining smooth and viscid-looking over its whole surface.

The life history of the Scab fungus, as shown by a microscopic examination of the drop cultures and those on solid media, is briefly this. One of the longer or shorter rods or spirals, or any portion, however small, torn from the ordinary vegetative filaments, when placed in a nutrient medium, produces directly an intricately branched mass of extremely fine filaments, from five to eight or nine ten-thousandths of a millimeter in diameter, which grow in all directions in short, irregular curves. In water no septation whatever is visible in the vegetating filaments; but on the application of iodine, divisions are seen at irregular intervals giving the appearance of septation, which may perhaps be only spurious. Under certain conditions these filaments may grow up into the air and become spirally coiled at their extremities, and subsequently rather closely septate, may break up into a mass of short pieces resembling bacteria, at the same time turning from white to gray in gross appearance. In addition to this form of fructification, certain bodies, apparently resting spores, are sometimes formed, especially in liquid media, when the fungus is subjected to unfavorable conditions. These bodies are produced in the continuity of the filaments, especially at their extremities, are roundish or oval, refractive and much like spores of bacteria in general appearance. Their germination, however, has not been observed, and it is possible that they may not be reproductive bodies.

Inoculations made with the Scab fungus.—These pure cultures were not obtained until after the opportunity for using them in making inoculations out of doors had passed; but in the meantime, as a matter of curiosity, infections were made by transferring as small a portion of the gray material as could be taken on the point of a sterilized needle, directly from the diseased potatoes, to a number of sound ones which were found to be still growing out of doors at the time. The tubers to be infected

were carefully uncovered, washed with distilled water, and a cavity made around them so that they could be covered by a pane of glass, which was in turn covered with a few inches of soil. The tuber lying exposed in the cavity could thus be readily examined at any time by removing the earth and looking through or raising the glass. Some half dozen hills were thus treated, from one to three potatoes being exposed and infected in each hill. Within three days after the inoculation the point at which the tuber was touched by the needle began in every case to show the characteristic symptoms of the disease, and subsequently developed into scabs similar to those from which the infection material was obtained, and accompanied by the same gray organism. This experiment was of course valueless as a test inoculation, not only from the fact that the material used was not known to be pure, but because very many of the potatoes in the neighboring hills were subsequently found to be diseased in the same way, and it is merely mentioned as in a measure confirmatory of the results of subsequent inoculations made under more strict conditions.

There was fortunately available at this time a small lot of sprouting potatoes obtained from a greenhouse experiment of the previous winter. These tubers were planted at once in three small greenhouse borders affording about eighteen small hills for experiment, and by the first of October tubers were formed in them large enough for inoculation experiments. One or more of these tubers were then uncovered in each hill, and were treated as above described in connection with the inoculations made out of doors. They were then inoculated with pure material of the scab organism taken from the agar peptone broth cultures, the aerial "fructification" on these cultures being more convenient for the purpose than the tough, stroma-like crust on the remaining substrata. The inoculations were made in two ways; in the one case by using a stiff platinum wire as a needle in transferring the infection material, by which a slight injury was inflicted on the epidermis of the tuber at the point of contact, and in the other by using a piece of very thin platinum foil cut to a long slender point, by means of which the scab organism could be transferred without any such injury to the epidermis. In the majority of cases the infection material was placed upon the surface of the tuber at a single point; but in others, as a means of showing an unquestionable and direct connection between the process of infection and whatever results might arise from it, the

material was applied at a definite series of points, forming circles, lines, curves or letters, as shown in fig. 2 of Plate I., where the monogram R. T. was employed for this purpose.

Two sets of infections were made at an interval of five days in order to compare the periods which might elapse between the infection and the first appearance of any effect which it might produce upon the surface of the tuber. As in the infections made out of doors, the effect of the inoculation became manifest within three or four days by the appearance of the characteristic brown stain in every potato infected; with one exception in the case of a nearly mature tuber in which none of the several points infected showed any diseased condition of the adjacent tissues. In the other cases the infection was apparent at every point of application, with few exceptions where the continuity of lines was interrupted by the failure of a point here and there. The infection was most certain where the epidermis was slightly injured at the point of contact or where this point was a lenticel; but in very young tubers three-quarters of an inch or less in length an entrance seemed to be effected at any point of the surface without reference to lenticels or any injury. In one case more particularly a potato of some white, smooth skinned variety, was infected in the form of a letter R when a little more than half an inch long, the material being placed on its surface so as to inflict no injury and the definite area of discoloration and corky growth which resulted was an unbroken reproduction of the letter. This particular specimen was kept uncovered under its glass plate until it had grown about a third larger than when infected, after which it was cut from the stem and put in alcohol. It was found, however, that the method of experiment employed was open to a serious objection in that the tubers, shortly after they were uncovered, ceased to grow, or grew only slightly, so that the diseased spots resulting from the infection, reached no considerable dimensions, although after about a week all showed the usual corky formation together with more or less cracking of the surface and were visibly accompanied by the gray organism as in the specimens obtained out of doors. For this reason several tubers, on which the infection was seen to have taken, were hilled over on the eighth day and left buried for a fortnight. At the end of this time they were again uncovered, and were found to have made considerable growth while the diseased spots had become much larger and more prominent, resembling in all respects the ordinary deep scab.

In these two sets of greenhouse infections, twenty-two potatoes were infected as above described, and the disease was reproduced in them all, with only one exception already mentioned in the case of a nearly full grown tuber which showed no signs of disease at the point of application, although the infection was accompanied by a slight injury to the epidermis. This failure was probably due to the age of the potato when infected, since a tolerably rapid growth appears necessary, as would be expected, in order to produce well-marked scabs; although it might be accounted for by variations in the susceptibility to the disease of different varieties of potatoes. It may be mentioned further that the infected potatoes, while uncovered, showed no spots of disease at other points than where the material was applied, and the same was true in the majority of those which were subsequently covered. The potato infected in the form of a monogram, for example, reproduced on Plate I., was absolutely without a flaw over its whole surface apart from the direct results of infection. In two or three cases, however, where the potatoes were covered, a spot of scab appeared here and there near the original point of infection. Such spots may, of course, have had an independent origin, but were probably due to the fact that a little of the scab organism was brushed from the original point of infection in covering the tuber.

Of the thirty-six uninfected tubers which were obtained when the hills were finally dug, five showed from one to several scab marks each. Of these, two were exposed in cavities where other tubers were infected and may have become diseased in this way, while the other three were undoubtedly independently affected. Since, however, the remaining thirty-one were quite clean, the presence of so small an amount of independent infection cannot be said in any way to vitiate the general results obtained.

Summary.—To summarize the writer's observations, then, it may be said, that whenever he has examined the disease out of doors it has invariably been found to be visibly accompanied by the growth of an undetermined fungus, at least in its earlier stages, and that this fungus when cultivated in an absolutely pure condition on nutrient substrata and thence transferred to growing tubers with the necessary precautions, reproduces in them the disease called scab, from which it was originally obtained, the observations and experiments made so far being convincing, to the writer at least, that the two are directly associated as cause and effect.

This may seem too positive a statement; based as it is on necessarily limited experiments which cover so short a period of time, not even including a single growing season, in the face of equally positive statements to the contrary by previous investigators. Prof. Sorauer* for example remarks that "one finds in and on the dead tissue divers kinds of fungi, but none which attack the sound tissue." Again, Prof. Arthur says in his report† upon the subject, "no particular kind of fungus or small animal, in truth no fungus or animal at all can be found invariably to accompany the injury at any particular stage of its development," and Prof. Humphrey who has recently conducted careful experiments on the subject in Massachusetts concludes‡ that "no organism of any sort was found constantly or even frequently present at any stage of its progress and there can be no doubt that it is not the result of the activity of the development of any living thing other than the potato plant."

That a particular kind of fungus *does* invariably accompany the injury studied by the writer, at least in its younger stages, he has satisfied himself by careful examination in the field, and in this respect he feels that his observations have been sufficiently extended to warrant a positive contradiction of the statement that such is not the case. That this fungus does attack the sound tissues is certainly indicated by the infection experiments above described, neither can it be said that the diseased condition is merely a result of the activity of the tuber, except in so far as this is true of any disease accompanied by abnormal growth in or near the tissues involved.

"*Deep*" *and* "*Surface*" *Scab compared.*—It will doubtless be asked how the results just described are to be reconciled with equally positive results obtained by Mr. Bolley which have been previously referred to, and what explanation can be given of the fact that the scab fungus, although so conspicuous and easily recognized by its accompanying stain, was not observed in any of the latter's cultures. This apparent contradiction arises, in the writer's opinion, from the fact that, although Mr. Bolley appears to have demonstrated the bacterial origin of the form of scab which he has investigated, he is in error in one important particular, namely, in assuming that the disease he has studied so

* Pflanzen-krankheiten, Band 1, p. 231.

† 6th Ann. Report of N. Y. Agr. Exp. Station, 1887, p. 344.

‡ 7th Ann. Rep. Mass. Agr. Exp. Station, 1889, p. 220.

ably includes all the diseased conditions commonly known in this country under the name of "scab." As a matter of fact, there appear to be two quite different diseases, very similar in general appearance, which have been distinguished by Prof. Humphrey as "deep" and "surface" scab, although still considered by this writer as merely variations of the same affection. In the "surface" form the corky modification of the diseased tissues is much more prominent than in the "deep" form; producing a slight elevation, in the beginning at least, on the surface of the tuber; and appears much less inclined to give rise to general decay resulting in the pockets characteristic of the deep form. This latter, even in its earlier stages, is apt, when the surface of the tuber has dried off, to produce a depression rather than an elevation, and the diseased area is rather scaly or scab-like than evenly corky, as in the earlier condition, at least, of the surface form. The deep form, again, is always accompanied by a more or less prominent discoloration, which becomes dark and pronounced as the disease progresses, and is undoubtedly owing to the staining action of the scab fungus already referred to. The fungus seems to be much more rapid and corrosive in its action than the bacterium, a fact which may account for the presence of a more abundant corky growth in connection with the latter, which its less rapid action would render possible. This is also indicated by the usually more deep-seated and serious character of the fungus injury, as well as by the fact that the bacterium, as Prof. Arthur informs me, is unable to produce any effect unless applied to the tuber while very young; whereas the fungus can be made to produce a marked effect upon good-sized growing tubers, as is shown in fig. 2, Plate I., the tuber represented having been two-thirds grown when inoculated.

It is necessary to state, however, in connection with what has just been said, that the writer's experience with "*surface*" scab has been very limited, and that he can speak with certainty from sufficient personal observation only concerning the so-called deep form. As a matter of fact, the surface form was not observed in any of the fields where the deep form was injurious, and only a few specimens of it were received among a quantity of tubers affected by the deep form which were sent to the Station from Guilford. These specimens together with a few others, for which the writer is indebted to the kindness of Messrs. Arthur, Bolley, and Humphrey, are all the material available upon which

to base an opinion. Insufficient though it be, however, it shows a distinct variation in the type of the disease, and the assumption that such a difference really exists is apparently the only rational explanation which can be brought forward to account for successful inoculation experiments both with the fungus and with the bacterium.

The fact that the deep and surface forms often occur side by side on the same tuber, as in the specimens received from Prof. Humphrey, seems to be entirely explicable, and in no way calculated to throw doubt on the probable existence of the two distinct diseases above characterized. That the deep form if distinct should not occur in the west in company with the surface form is hardly to be believed, in view of the ease with which such a disease would naturally be disseminated through the yearly movements of the crop. It is therefore somewhat remarkable that the fungus should not have appeared in any of Mr. Bolley's cultures, unless it may be explained by his avoidance, in seeking material for cultivation, of such scabs as were "blackened or pitted,"* pitting and blackening being, as already mentioned, characteristics of the fungus disease.

Botanical Relations of the Scab Fungus.—In regard to the true position of the fungus of deep scab nothing definite can be said, and a more detailed account of it from a botanical point of view, together with figures of its microscopic and gross appearance, is reserved for another year, when more definite information concerning its botanical relations may be available. Except for its apparently true branching and aerial "fructification," it reminds one strongly of some of the polymorphic bacteria, for which it was taken when first observed. The two characters just mentioned seem, however, to exclude it from the bacteria; but where among the Hyphomycetous fungi it can be properly referred is a question concerning which no botanist to whom it has been referred has been able to give any information. Possibly it may be found in some such ill-defined genus as *Oospora.* That it or its prototype has not been already described seems very improbable, since a fungus resembling it closely in microscopic characters and general mode of growth is one of the commonest forms of mould among the many species which appear upon barnyard manure and dung and rubbish of all sorts. This common form, however, does not produce the black stain upon its

* Bolley, l. c., p. 277.

substratum so characteristic of the scab fungus, and further differs from it in the great abundance of its "fructification" on media upon which the scab form produces none at all. Otherwise, it resembles it so closely that the two can hardly be distinguished microscopically. In two cultures of this form on potato jelly a slight blackening was observed after several weeks, but it was comparatively faint and not comparable to the deep stain which appears in cultures of the scab form in a few days.

The writer will be glad to receive notes of observations on this subject, or specimens of the different varieties of scab from any one interested.*

MISCELLANEOUS NOTES.

Diseases of Tomatoes.—For some reason not readily explained Tomatoes in various localities have, during the latter portion of the last season, been greatly injured by the attack of various fungi, which in 1889 did no special damage to the crop. The most noticeable injury was done by the fungus of the Potato Rot (*Phytophthora infestans*) which not only attacked the leaves so as to do considerable damage, but appeared with virulence upon green and even partly ripe fruit, causing it to turn brown and black, and producing decay. The same fungus was also observed in Maine, destroying green tomatoes early in October, although the writer has not previously noticed that it attacked them. Should this taste for tomatoes be perpetuated, it will be necessary to resort to Bordeaux mixture or carbonate of copper in order to save the September crop. It is unlikely, however, that it will become permanently serious.

In addition to the *Phytophthora* considerable injury was done locally by the brown *Cladosporium fulvum* upon the leaves, which was much more virulent than in the previous year, in some instances killing the vines completely, towards the end of September.

The tomatoes themselves have also suffered to an unusual degree from several fungi which, like the fungus of potato rot, may attack them before or after they are ripe. Of these the two most injurious appear to be *Macrosporium Tomato*, Cke. and

* Since the above was in press a second set of infections with the scab fungus have been made successfully in the greenhouse. Infections with the similar organism obtained from horse dung have given no result. Concerning the latter. Prof. Saccardo writes that it may be doubtfully referred to his *Oospora perpusilla.*

Fusarium Lycopersici, Sacc., the former producing roundish decayed areas which become covered with an olive-brown or black velvety coating of the *Macrosporium*. The *Fusarium* usually appears on the ripe fruit, especially where it has cracked, forming a thick coating of mould, at first white then reddish salmon colored. The injury of these fungi may be decreased by gathering and burying the tomatoes as soon as they show signs of disease. If left in the field they are sure to communicate the disease to the sound tomatoes.

Fungus Disease of Tomato worms.—Although numerous insects are known to be subject to the attack of parasitic fungi of various kinds, the smaller forms are usually the greatest sufferers and the writer was therefore surprised to find a destructive epidemic among the tomato worms (*Phlegethontius Carolina* and *P. Celeus*) infesting a field in the vicinity of New Haven. The same field had been largely stripped of its foliage by the worms in the previous year; but this season sustained comparatively slight injury owing to an epidemic caused by an *Empusa* similar in nature to the fly fungus so common in houses during the late summer and autumn. When this field was examined the epidemic was nearly at an end, very few larvæ remaining; but the owner stated that the dead tomato worms were hanging on the vines in large numbers a few weeks previous, as was attested by numerous blackened remains still adhering to the stems. A small lot of larvæ just killed by the disease was, however, obtained, from which the character of the affection could be ascertained. Just before death the larvæ become slightly milky, changing to greenish-yellow after death and collapsing to a greater or less extent. A few hours after death the fungus appears as a whitish coating on the skin and an enormous number of spores are discharged. The presence of a fungus in the case would hardly be noticed without a hand lens, as the hyphæ barely project beyond the integument and are very inconspicuous. As the spore discharge ceases the larvæ become rapidly soft and flaccid turning black and putrid. The fungus is the same (*Empusa Grylli* form *aulicæ*) which is common on hairy caterpillars and has also been found this year on a number of naked cut-worm larvæ (*Lithophane*, *Mamestra* and *Agrotis*). It was found easy to propagate it on young tomato worms, which died after the usual period of incubation (six to ten days,) with the characteristic symptoms. This is the first instance recorded of an *Empusa* upon larvæ of any of the Sphingidæ.

Fungus Disease of Grape leaf hopper and Cabbage worms.—During September the Grape leaf hoppers (*Tettigonia vitis*), which were abundant and causing no little injury to the grape leaves in Mr. Coe's vineyard at Meriden, were found to be attacked in great numbers by another species of *Empusa*, which eventually destroyed them entirely. At the same time a single specimen, rather old, of the Cabbage worm (*Pieris rapæ*) was found at New Haven infested by apparently the same fungus ; a circumstance which suggested to the writer a repetition of an experiment performed several years before, by which a single cabbage worm had been successfully inoculated with the disease transferred from the apple leaf hopper (*Typhlocybe mali*). The matter was of some economic interest from the fact that the *Empusa* in question is destructive to numerous noxious insects and would be perhaps the most available species to employ should it be found practicable to use such fungi as a means of artificially spreading disease among injurious insects.

Twelve small *Pieris* larvæ were selected and confined for a day with several of the diseased leaf hoppers from which there was an abundant discharge of spores. The larvæ were then fed in a crystallizing dish and grew rapidly. The weather was very cool at the time so that the period of incubation was considerably lengthened ; nevertheless, between the eighth and thirteenth day all of the larvæ had died and were found to be filled with the resting spores of the fungus, with the exception of one specimen which was killed by parasitic insects (*Pteromalus*) soon after infection. What appears to be the same *Empusa* has been kindly sent from New Jersey by Prof. Halsted, on *Pieris* larvæ, and the same fungus is reported to have killed vast numbers of the clover weevil in the same locality during the past season.

Peronospora on Cucumbers.—The occurrence of *Peronospora Cubensis*, B. C. on cucumbers may be noted as of interest in extending the range of this peculiar species, which was first found in Cuba, then in Japan, and quite recently in New Jersey and several other localites in this country. It produces yellow spots upon the leaves which resemble the injury of the melon aphis ; but did not seem to be very injurious at South Manchester where it was first observed.

Mildew of Lima Beans.—This mildew (*Phytophthora Phaseoli*) described and figured in last year's report, has been again destructive this year and has made its appearance in a number of

new localities in the neighborhood of New Haven. So far as ascertained it extends from New Haven to Hartford and west to South Norwalk, but has not yet been discovered outside of Connecticut. Its serious nature is indicated by the damage it has done during so unfavorable a season as that of 1890, and farmers are again strongly advised to use the precautions for keeping it in check mentioned in the Report of this Station for 1889, p. 171.

Rust of Pears.—The several varieties of pear of the Japanese strain (*Kefir*, etc.) have shown themselves very susceptible to injury by one of the rusts derived from the red cedar; the particular "cedar apple" which in this case has its third or Roestelia stage on pears, being what is known as *Gymnosporangium globosum*, a form which also produces rust in Connecticut on Hawthorn, Apple, Quince, etc., but does not attack the ordinary varieties of Pear. The fungus forms dull red orange spots on the pear leaves early in the season, the finger-like Roestelia stage developing from the under side of these spots during August and September. The presence of this fungus interferes with assimilation, and when severe produces premature defoliation. The trouble may be decreased by cutting down neighboring cedars as far as possible or by spraying with fungicides immediately after rains in May.

Mildew on Buckwheat.—A mildew which appears to be the form described by Peck as *Ramularia rufomaculans* on another member of the same family (*Polygonaceæ*) has been observed in several localities on Buckwheat. It does considerable injury, attacking the lower leaves first and spreading upwards, stunting the growth of the plant and impairing the quality as well as diminishing the quantity of the seed. Nothing can be recommended for its prevention beyond burning of all stubble and refuse, and rotation with some other crop.

Clover Rust.—This rust, which was incorrectly referred to in the last Report as caused by *Uromyces striatus*, proves to be *U. Trifolii* Wint. and has been very abundant this year. Its æcidial stage was not uncommon on white clover during June.

Rye rust and smut.—*Puccinia rubigo-vera*, D. C. has been unusually abundant on Rye this year, covering the leaves with its rust colored Uredo-form and doing considerable injury. The Rye smut also (*Urocystis occulta*, Rabh) has been very common, though not enough so to be very injurious.

PLATE II.

Adjacent rows in same orchard, showing results of no treatment, (Photo Oct. 31.)

PLATE III.

SOME RESULTS FROM THE APPLICATION OF FUNGICIDES.

Leaf-spot of Quince (*Entomosporium maculatum*, Lév.)

The leaf-spot of quince has become a very serious trouble in Connecticut as well as elsewhere, and the writer knows of at least one large orchard which has been entirely abandoned from this cause. The Station has therefore made several tests of the efficacy of fungicides in this disease with results which may be seen by reference to Plates II. and III. of the present report, which show the effects of treatment and no treatment respectively, and represent exactly the condition of treated and untreated rows side by side in the same orchard as they were photographed by the writer on October 31.

The appearance and results of the disease are too well known to need description; but it may be mentioned briefly that the fungus in question forms small reddish-brown spots on the leaves and fruit, which extend with considerable rapidity, turning rust-colored on the leaves and causing them to fall prematurely, even as early as July. Such defoliation not only exhausts the tree and prevents the fruit from maturing, but hinders the proper maturing of the next year's buds.

The principal experiment upon this disease was made at Milford, where Mr. Geo. F. Platt kindly afforded facilities to the Station for the treatment of a part of his orchard, another part being left untreated. The orchard in question is arranged in rows of about fifteen large, thick bushes each; and of these, two rows were treated with Bordeaux mixture and two with the ammoniacal carbonate of copper, both of these substances being prepared according to the formulas given on pp. 110–112. The method of application is shown on Plate IV, the fungicide being carried in a hogshead set in an ox cart or single wagon, and the force-pump (Gould's double-acting) mounted directly on the hogshead. The Vermorel nozzle, with its cap-hole reamed, was used, carried on the end of light ¼-inch linen insertion tubing supported on a light pole, as in the figure. By standing in the cart and driving between the rows all parts of the bushes were easily reached. Two persons to spray, one on either side, and one to drive and pump, allowed of very rapid work; which is essential in any spraying in order to take advantage, as far as possible, of fine weather, so as to be sure that the substance sprayed will be thoroughly dried on the foliage before it is subjected to rain.

The quinces in question were sprayed only *four* times, once just before they bloomed, May 17; once as soon as the blossoms had fallen, June 2d; again on June 25th, and for the last time on July 28th. The month of July was unusually dry, otherwise a fifth application would have been necessary about the middle of this month. As it was, however, this small number of applications served to retain the foliage completely on the rows sprayed with Bordeaux mixture, as may be seen by reference to the Plates just mentioned. The rows sprayed with carbonate of copper were, however, not as well protected, saving only about 80 per cent. of their foliage, while the untreated portions retained only from 10 per cent. to *none* of their foliage. Unfortunately, whether owing to the defoliation of previous years or to causes which led to the general failure of fruit to set during the past season, the greater part of the young quinces fell off through the whole orchard soon after the blossoms had fallen; so that the effect of spraying could only be observed on the comparatively small amount of fruit which remained on the treated bushes. On the untreated bushes no fruit matured, except here and there a small, gnarled specimen; while, as Mr. Platt informs me, the fruit from the treated rows was unusually large, fair, well-flavored and juicy.

There can therefore be no question of the efficacy of the Bordeaux mixture in this disease, and it will be of interest to compare the effects of previous treatment and its absence, in connection with further trials which are planned for the coming season.

The writer also sprayed a number of quince bushes with the Knapsack Hydronette, in the orchard of Mr. N. S. Platt at Cheshire. Only three applications were made—one May 9th, which was much too early; one May 31, which was much too late; and one June 24. Despite the fact that the applications were not made at proper times and were so few in number, Mr. Platt writes under date Oct. 24: "As to the Quince trees you sprayed, they are still well covered with leaves, while all the others in the orchard are practically bare."

Black Rot of Grapes.

Mr. Coe has continued spraying for this disease in his vineyards in Meriden during the past season with very conclusive results, especially in the lower vineyard, which for several years past has been completely devastated by black rot, except when it

was most thoroughly sprayed in 1889. The important precaution was taken this year of ploughing between the rows and covering the ground directly under the vines with earth enough to bury whatever diseased grapes might have fallen the previous year. The applications of Bordeaux mixture were made three times: once just before the vines blossomed, once just after the fruit had set, and once the last week in June, and were followed by two applications of ammoniacal carbonate of copper about the middle and last of July. As a result of this treatment the crop from the main portion of the vineyard was almost perfect, and when examined in September showed only here and there a cluster with a few diseased berries. Two rows were left untreated as checks, but were given one spraying by accident, so that they did not fairly show the advantages derived from the treatment. In these rows hardly a single cluster was unaffected by the rot, and a great majority of them were ruined for marketing purposes or wholly destroyed. Another section was treated twice with ammoniacal carbonate of copper and then neglected, and in this case also the great majority of the clusters were destroyed.

The use of the ammoniacal carbonate of copper was found entirely satisfactory in obviating the injury done by late treatment with Bordeaux mixture through its adherence to the grapes when harvested, no stain being left upon the clusters, which were quite clean with a perfect bloom when harvested in September.

In this connection attention may be called to the report of Prof. Chester on this subject based on his experiments at the Delaware Experiment Station (Bulletin X), which is especially valuable from the financial summary which he is able to give from detailed memoranda of one of his experiments. In this case 879 vines were sprayed four times with Bordeaux mixture and once with carbonate of copper and carbonate of ammonia mixture at an expense of labor and material amounting in all to 3 cents per vine for four applications. The net income per vine was 75 cents, leaving a balance of 72 cents per vine to be laid to the credit of the treatment.

It may be mentioned that the most critical period in this State seems to be about the last of June, the disease beginning its worst visible inroads about the 10th of July. The last spraying in June is therefore a very important one and should be made thoroughly and above all things in time, say by the 25th.

Anthracnose of Grape.—At the writer's suggestion the usual treatment for this disease was tried by the Connecticut Valley Orchard Co., with the result of a very marked improvement in the condition of the vines and in the yield of marketable grapes. The vines were very severely trimmed, all possibly diseased wood being cut out and burned, and then treated with a strong (25 per cent.) solution of sulphate of iron. The vines were subsequently sprayed with Bordeaux mixture and carbonate of copper as for the black rot. This year's experiments indicate that this disease can be successfully treated, though more serious than black rot. The severe trimming and winter treatment, either with a strong solution of sulphate of iron, or of sulphate of copper (one pound to twenty gallons) are both of the first importance and practically indispensable in contending against it.

Leaf spot of Plums and Cherries causing defoliation.—This disease, often called the "gunshot injury," is very generally injurious in the State to plums and cherries, defoliating them prematurely. Mr. Coe repeated the application made last year to several large plum trees, thereby preserving their foliage intact. The Bordeaux mixture was also used by the Valley Orchard Co. for plums and cherries with similar results, while a few trees left untreated lost their foliage in July.

Potato Blight.—Mr. N. S. Platt writes from Cheshire in regard to this disease. "We applied one spraying of Bordeaux mixture to some late potatoes about Aug. 10, a full week after the blight had made its appearance in the field. Five rows thus treated kept green three weeks after the others were dead and black. At digging, about Sept. 24th, the treated rows were much the best in size and practically free from rot. The untreated rows were smaller and considerably decayed. The measurements at digging were :

Untreated	3¾ bushels per row.
Treated	6 bushels per row."

Strawberry Rust.—A section of Mr. Atwater's strawberry bed in Cheshire was sprayed to ascertain the effect of Bordeaux mixture on the leaf spot of strawberry. Bordeaux mixture was applied once May 9, just before the plants came into blossom, and ammoniacal carbonate of copper was applied on May 31, just after the bulk of the fruit had set. Neither mixture adhered well and very little, if any, difference could be observed between the

treated and untreated portions, which were both not greatly injured by the fungus.

Trials have also been made with fungicides against Black Knot of plums, Anthracnose of beans, and Mildew of peas, but further observations are necessary before making any report upon them.

Further Experiments on the "Smut" of Onions.—In the last report the writer gave the results of the season's experiments upon onion smut, which indicate that an application of flowers of sulphur sown with the seed, on very smutty land, would increase the yield in a ratio of about 34 to 7 where no sulphur was applied. In order to test the matter more fully further experiments were made in a greenhouse border infected with smut spores, the object being to discover whether a more direct application of the sulphur than was previously made might not give better results than were previously obtained. The relative proportions, however, between the number of onions surviving in the treated and untreated rows remained about the same (5 to 1). A larger experiment was also tried at Greens Farms, the fungicides being sown directly with the seed by means of a hopper cleverly devised by Mr. Guyer. This contrivance, however, was not found adapted to use in the field, although working to perfection on a smooth floor, and constant shaking and pounding was necessary to produce any flow of the fungicide, which was therefore not only distributed very unevenly, but failed entirely in many sections of the rows. In addition to this the seed also failed in a great measure, not more than from 10 to 20 per cent. coming up. The experiment was therefore practically valueless, although even under these conditions the ratio in favor of the sulphur treatment was 25 to 8. Sulphide of potassium gave a slightly better result, and sulphide of calcium showed only very slight differences; while muriate of potash, muriate and lime, and hyposulphite of sodium gave no favorable results whatever.

This experiment, although in itself of little value, when taken in connection with those previously made, seems to indicate that no greater advantages will be gained by using the sulphur treatment than were previously reported, and whether this advantage is sufficient to recommend its use to those troubled by the disease is for them to decide.

A single point of interest was ascertained in connection with the greenhouse cultures, namely the ability of seedlings showing smut at isolated points near the top of the first leaf to recover

entirely from the disease. This fact indicates that the first leaf is susceptible to infection by the germinating smut spores, while it is being pushed up through the ground, and that the collar of the embryo can hardly be the only point thus susceptible since recovery would hardly be supposable in this case. Substances applied for treatment must therefore act not only about the seed, but in the earth through which the first leaf is pushed.

FUNGICIDES AND THEIR APPLICATION.

The present notice is designed to call the attention of farmers to the importance of gaining some practical knowledge of the use of fungicides and to furnish brief directions for this purpose. More detailed information on the subject adapted to special cases will be furnished by the Station on application, and when practicable, personal attention will be given in such cases if desired.

The advantage resulting from the application of fungicides has been so thoroughly and repeatedly demonstrated in connection with the diseases of the grape and various other similar affections that their use may be recommended without reserve in such cases. In many of the most serious diseases of this nature it is absurd any longer to talk of "experimenting" for their prevention by fungicides. Their prevention by this means is an established fact, and in no sense a theory or probability, the truth of which is still in doubt. Such "experiments," therefore, in many cases, are now quite superfluous in connection with the general demonstration that we have the means for such prevention, and are justified only as local object lessons or with a view to improving in some way upon the means or methods already known and approved. Such local object lessons are, however, of very great importance and utility for the reason that farmers are naturally conservative in their attitude towards unfamiliar modes of procedure connected with their calling, and are inclined to demand an ocular demonstration in such cases. Object lessons of this kind, in so far as they can be carried out by the Experiment Station, must necessarily be very limited in number, and farmers are therefore urged to experiment for themselves, not only by spraying for the prevention of fungus diseases, but of insect depredation as well, since the treatment of both can often be combined by mixing the fungicide with an insecticide. The Station, however, does not recommend anyone who has had no

PLATE IV.

Method of Spraying Orchards with Double Acting Pump and Vermorel Nozzles.

previous experience, either personally or from personal observation, to attempt spraying on a large scale unless under supervision; but rather to experiment on a small scale at first; so that by making a direct comparison between the results of treatment and no treatment, he may form an opinion as to the value of the application from his own experience.

It is very necessary, however, that even a small experiment should be made intelligently and thoroughly. Anyone who thinks he can do such work without previously informing himself on the subject had much better let it alone, since he is quite as likely to fail as to succeed, and thus to mislead others as well as himself. The first requisites for success in spraying, are a definite knowledge of the disease which it is proposed to treat, of the proper means to use for the purpose, and of the proper manner of using such means. Many persons imagine that all that is necessary is to get some of the fungicide on the leaves no matter how or when. As a matter of fact the "how" is of the first importance. Always in the case of fungicides and in the majority of cases in the use of insecticides a proper spraying nozzle, like the Vermorel, which will give a uniform and very fine spray is *an absolute necessity. All* the foliage to be treated must be wet and *not drenched.* It is quite impossible to gain this end by using an ordinary rose spray nozzle or by holding one's thumb over the mouth of a common straight nozzle. Such means ensure great waste as well as an uneven distribution of the material used, which, under these conditions, is sure to injure by drenching the foliage to which it is applied if such injury ever accompanies its use. A proper nozzle and force pump, properly mixed materials and a knowledge of the proper times for applying them in the particular case in which they are to be used, are three prime essentials for success in spraying, and if either one is disregarded success need not be expected.

Information relating to the subject should not be sought in manufacturers' circulars, which are quite as likely to mislead as to be of service; but from some authoritative source, such as the publications of Experiment Stations, or of the proper section or sections of the United States Department of Agriculture, supplemented, if possible, by personal correspondence. Such action will lead to the avoidance of all sorts of mistakes connected with the operation and greatly increase the chances of success.

Nozzles.—For all general purposes of spraying the *Vermorel* nozzle is by far the best, being adapted for liquids having substances in suspension as well as for those which are clear, and may be employed for all kinds of spraying. When used in connection with a force pump of fairly good power, the orifice in the cap through which the spray is driven, may be reamed out to twice the size of the largest hole in either of the two caps (coarse and fine) which accompany each nozzle, and thus far quicker work can be done, the spray obtained in this way being far more copious and abundantly fine. The hole must be enlarged with a reamer, *not* with a drill, since the orifice must flare to produce the broad funnel-shaped spray peculiar to this nozzle.

The *Nixon* nozzle produces a copious and direct smoky spray by driving a small stream through a fine gauze cap, and is unsurpassed for spraying *clear* liquids. Having no means by which, like the Vermorel nozzle, it may be readily cleared when it becomes clogged, it is not available for liquids like Bordeaux mixture having substances in suspension, and since the majority of liquids used are not clear, it is much less generally useful than the Vermorel.

The ordinary rose or "fine spray" nozzles, such as are advertised by most dealers, are generally useless or inefficient for the desired purpose.

Hose, for spraying must be light, so as to be readily carried on a pole as shown in Plate IV. The best kind for the purpose is what is known as *linen insertion tubing* ($\frac{1}{4}$ inch), which combines lightness with durability and cheapness. The hose should be attached to a light pole of sufficient length to reach above the foliage to be sprayed, so that the spray may be directed downwards upon it. In order to control the duration of the spray without trouble it will be found convenient to screw a short piece, about a foot long, to the end of the pole, so that it will turn easily on the screw. Then drive two nails into the pole in such a position that this piece can only turn the distance of a right angle, that is, from a position at right angles to the pole to a position in which it is in line with the pole. Then fasten the end of the hose, together with its attached nozzle, firmly to the end of this piece, the base of which should also be attached to the hose passing over it. In this way the nozzle and hose move with the piece and can be made to turn at any angle, from a straight position adapted for direct spraying, to a position at

right angles for downward spraying, by simply turning the pole on its axis. The hose should be fastened by a loose loop once to about the middle of the pole, around which it may be conveniently wound once or twice. By holding a turn of the hose between one hand and the pole a slight pressure will stop the flow of liquid, when desired, as effectually as a stop-cock.

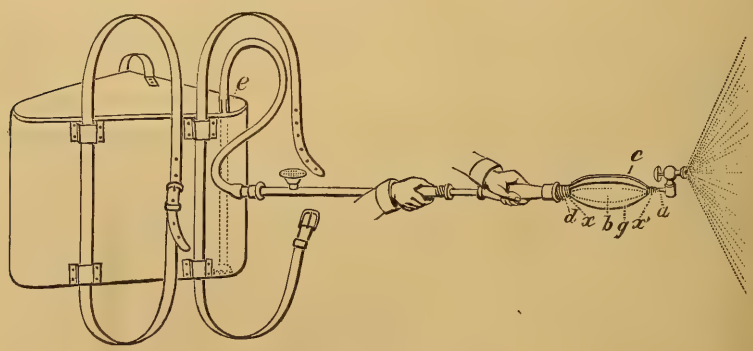
Pumps.—For a stationary pump which is to be mounted on a hogshead or other vessel containing the substance to be sprayed and drawn from place to place, when needed, on wheels or in some vehicle, any good force pump will answer. A double-acting force pump fitted with couplings on both sides, to which two sets of hose may be attached (or three sets if one side is fitted with a Y-coupling), is very much the most useful form of pump for spraying on a large scale. Where a Y-coupling is used one set of hose may be turned into the hogshead and fitted at the end with a very small orifice, through which a fine stream may be discharged that will keep the mixture constantly stirred, while the other two sets are left free for use with nozzles, thus allowing a discharge of spray on both sides from a vehicle driven between two orchard rows, as shown in Plate IV.

The Station has used for this purpose Gould's double-acting spraying pump, which is shown in operation in Plate IV, and is powerful, while at the same time simple and compact, being easily taken apart and readily carried by one person. A Y-coupling can of course be used with a single-acting force pump, allowing the use of two sets of hose for spraying, if the stirring is done by hand : the double-acting pump is much more convenient, and not more expensive.

For spraying on a small scale, or where a mounted hogshead cannot be driven, some apparatus combining a supply of the material with a proper force pump is the most convenient. A comparatively inexpensive machine of this sort, devised by Mr. Galloway, and said to be convenient and effectual for the purpose, may be made by any brass worker or obtained as stated at the end of this article. This machine consists of a tank carried on the back and containing the force pump as well as the liquid to be sprayed, the pump being worked by a lever passing over the right shoulder, while the spraying lance, fitted with an improved Vermorel nozzle, is held in the left hand.

The writer has used for the same purpose during the last two years, a home-made apparatus which, with slight improvements,

has proved very satisfactory and effective during the past season. This consists in a copper tank of convenient shape for carrying on the back, to which is adjusted an ordinary Aquanette or Hydronette hand force pump, as shown in the figure. For the wash boiler figured in Bulletin 102 of this Station, is substituted a copper tank similarly shaped, but smaller and more convenient, which with a tin cover can be made for a price ($3 or less) considerably below that of the smallest size of wash boiler. The tank used at the Station is made, as a matter of convenience, considerably larger than necessary, for the purpose of allowing the Hydronette pump to be carried in it. This tank, which holds when full about six gallons, and is filled about two-thirds full when in use, is fitted with shoulder straps (inelastic suspender straps) and a piece barely large enough to admit the hose of the Hydronette is cut out from the end of the tank cover at the edge (*e*) and a short collar soldered into it with a slot on its outer side broad enough to allow the hose to be pushed into it sideways. The hose, after it is pushed in, should project through this slot just enough to be held firmly against the edge of the tank when the tightly fitting cover is shut down. The suction basket of the pump (*f*) therefore rests in the lower left hand corner of the tank, and by making the shoulder strap on this side slightly looser than the other, and thus tipping the tank a little towards this point, all the contained liquid will be drawn out.



Since pumps of the Hydronette pattern do not throw a steady stream, acting only when the piston is driven back, some appliance is necessary to produce an even, continuous spray. This is gained by the device represented in the figure. A piece, six inches long, of *heavy* ⅝-inch rubber *tubing* (hose will not answer,

neither will old bits of tubing which have been lying about in a rubber store till their elasticity is impaired) is drawn over the end of the Hydronette nozzle at x and over the base of the Vermorel nozzle at x' (the large coupling which accompanies this nozzle having been previously screwed off and laid aside) and each end x, and x', is then firmly wound with small copper wire so that the joints are firm and tight. The Hydronette nozzle and the Vermorel are thus connected by an elastic chamber formed by the tubing ; but since the latter is liable to burst if too great force is used in pumping, it is necessary to inclose the tubing in a cloth cylinder which acts to prevent undue expansion, like the netting commonly used about elastic syringe bulbs. Take a piece of stout cotton cloth, 6½ inches each way, and sew two of the edges together strongly, so as to make a cylinder 5½ inches in circumference. This allows sufficient expansion to the tubing without danger of its bursting. Slip this cylinder of cloth (g) over the tubing and fasten each end securely by winding it tightly with small copper wire. Then connect the two nozzles (a) and (d) by two heavy copper wires (c), fastened by winding once or twice around each nozzle. The Vermorel nozzle is thus held firmly in place, and as the large wires will stand any amount of bending, the direction of the stream is thus easily regulated. The size of the elastic chamber, and consequently the duration of the spray from a single stroke of the pump, may be increased by using a greater length of tubing and connecting the two nozzles by correspondingly longer wires ; but it will not be found convenient to use a size of tubing larger than ⅝-inch or to use a shorter length than 6 inches. In order to reach a greater distance with the spray, a few feet of light brass tubing may be soldered on to a coupling which may be screwed on in place of the Hydronette nozzle, and to the end of this tubing the Vermorel nozzle may be adjusted as just described.

The advantage of this apparatus is that in addition to its cheapness (its total cost is a little over $8.00), it leaves the force pump free, when not wanted for spraying, for any of the numerous uses to which such a pump is ordinarily put, and is also readily made by any one of ordinary intelligence. To make it work successfully, however, several things are necessary. First, the pump must be in good order ; properly packed, and the screw (h) which bears upon the packing must be loose enough to allow of an easy movement of the piston, which should be well oiled.

If the rubber tubing is not old and inelastic, and is properly adjusted, as described, no trouble will be found with the working of the apparatus. By alternating the motion, holding the right hand stationary and working with the left and *vice versa*, the operation is not at all laborious. If the pump is in good condition at the outset, it will not get out of order either from clogging or other causes, and very quick work can be done with it by enlarging the hole in the Vermorel cap as previously described. The writer uses this pump in preference to the Eureka sprayer owned by the Station, to which it is superior in several points, and is confident that it will give satisfaction when properly constructed.

Fungicides.—The Bordeaux mixture for general purposes can be recommended as more effectual than any of the somewhat numerous preparations which have been used as fungicides, although it seems probable that a cheaper and almost, if not quite, as effective a material will be found in some of the formulæ for precipitated carbonate of copper. Another year, however, is needed to test these thoroughly before they can be definitely recommended in place of the Bordeaux mixture. The ammoniacal carbonate of copper is decidedly inferior to the Bordeaux mixture; but is very useful for the last two sprayings in cases where there is danger of any considerable amount of the Bordeaux mixture adhering to fruit, grapes for example, when they are ready to gather.

Strong solutions of sulphate of copper or of sulphate of iron are also often useful for what is known as the winter treatment, which is very valuable, for instance, against the Anthracnose of the vine.

These three fungicides, the Bordeaux mixture for general purposes, and the others as above indicated, had best be employed by persons using fungicides for the first time, without regard to other formulæ which they may see advertised or recommended. The method of preparing them is as follows:

Bordeaux Mixture.

Sulphate of Copper (blue stone)	6 lbs.
Quicklime	4 lbs.
Water	22 gals.

Dissolve the sulphate of copper in two gallons of water, hot, to hasten its solution, which is also facilitated if the sulphate is pulverized. When all the sulphate is dissolved, dilute this solution

with fourteen gallons of water. Slake the lime, which must be fresh (i. e., not partly air-slaked), with six gallons of water, adding the latter slowly and stirring the mixture to a smooth paste. Allow this mixture to stand a short time, then stir it and pour it slowly into the sulphate solution, which should be rapidly stirred during the operation. Only use that portion of the lime which is held readily in suspension by stirring slightly. *Never pour in any of the coarser sediment, which settles readily to the bottom.* By using care in this respect the Bordeaux mixture will need no straining if the vessels and water are clean; that is, free from straws, chips, etc., but must otherwise be strained through fine brass gauze.

Carbonate of Copper.—This substance can be bought ready made at from 60 to 75 cents a pound; but can be made without great trouble at about 15 cents or less. Enough for a season's use had best be made at once, as follows. The substances needed for this purpose are sulphate of copper and carbonate of soda (sal soda) in the proportion of four parts of the copper to five parts of the soda. For instance, to make one pound of carbonate of copper it is necessary to use two pounds of sulphate of copper and two and a half pounds of sal soda.

The sal soda should be dissolved in hot water in one barrel, and the sulphate of copper in another. When both are wholly dissolved and *cooled* pour the sal soda solution slowly into the copper solution, stirring during the operation, which yields a heavy green precipitate of carbonate of copper. Since the sal soda is in excess and is injurious to foliage, it has to be washed out of the carbonate of copper. To do this fill the barrel up with water and stir it thoroughly. Then allow the carbonate to settle to the bottom of the barrel, and then siphon off the clear water which stands above it. Repeat this operation once. The carbonate of copper must then be strained out on a piece of porous cloth which can be tacked over a barrel so as to form a shallow bag into which the mixture of carbonate of copper and water can be poured and allowed to drain, after which it can be dried. No difficulty will be found in the process, and as it saves several hundred per cent. on the cost of material it is quite worth while.

At the suggestion of Prof. Johnson the carbonate of ammonia was tried as a solvent for the carbonate of copper and a lot of the solution made up in the laboratory, but not used for spray-

ing. Prof. Chester, however, of the Delaware Station, has used the same solvent in spraying during the past season, and recommends it as much better than ammonia for the purpose. Its trial, therefore, in preference to the ammoniacal solution, the formula for which is given below, may be safely recommended, as it is more than twice as cheap and easily prepared as follows, the formula being that used by Prof. Chester:

Mix three ounces of carbonate of copper and one pound of pulverized carbonate of ammonia; add two quarts of hot water, obtaining a clear solution. Dilute for use with water to fifty gallons.

Ammoniacal Carbonate of Copper.

Dissolve three ounces of carbonate of copper in one quart of strong ammonia (22°). Dilute for use with 25 gallons of water. Add the ammonia to the carbonate in a jar or bottle.

Since the prices of manufacturers and dealers in materials and apparatus necessary for spraying are very variable, special attention is called to the following quotations which are the lowest which the Station has been able to procure.

Quotations for spraying pumps and accessories given by W. & B. Douglas for goods ordered directly from their factories at Middletown, Conn. (These prices are *net.*)

Double Acting Spraying Pump (similar to Gould's) with all brass piston and brass outer cylinder	$9.50
——Double Acting Spraying Pump (similar to Gould's) with all brass piston and iron outer cylinder, fitted with leather valves	5.00
——The same, fitted with metallic valves	6.50
Three feet suction hose for same with couplings and brass strainer	2.25
Single couplings for ¼-inch hose	.25
Y-couplings " "	1.00
"Aquanette" force pump	4.00
Vermorel Nozzle (2 caps with coupling for ¼-inch hose or with large standard coupling as desired)	1.25
The Messrs. Douglas will also be prepared to furnish Prof. Galloway's Knapsack Spraying Pump previously mentioned or it can be obtained from Albinson & Co., 2026 14th St., or Leitch & Sons, 1214 D St., Washington, D. C., for about	11.00
Tanks arranged for use with Hydronette or Aquanette as shown in cut on page 108 can be made of unplanished copper with tin cover by any tinman for less than	3.00

Quotations for tubing given by the Goodyear Rubber Store, F. C. Tuttle, prop., 866 Chapel St., New Haven.

¼-inch linen insertion tubing (lots of 100 feet or more) per foot	.08
" " " " (lots of 50 feet or more) per foot	.10
" " " " (lots of less than 50 feet) per foot	.12
⅝-inch heavy rubber tubing, per foot	·20

Quotations for sulphate of copper given by The Nichols Chemical Co., 68 William St., N. Y.

For lots of 25 to 50 pounds f. o. b., New York, 5 cents per pound.

NOTE. BY THE DIRECTOR.

An *Ammonia-Copper Solution*, cheap and easy of preparation is perhaps best made as follows :—Provide—

½ pound of sulphate of copper (blue vitriol) pulverized.

1 " " hard and transparent* carb. of ammonia pulverized.

6 quarts of boiling water.

The substances may be easily reduced to coarse powder without loss by pounding with a mallet or stick of wood on a stout sheet of paper or in a small box.

Bring the carbonate of ammonia and hot water together in a wooden pail and stir until foaming ceases, then add the copper sulphate and stir again as long as the mixture effervesces. The blue and nearly clear liquid diluted to 62 gallons (2 barrels) will correspond to Prof. Chester's formula, or diluted to 31 gallons will be nearly equivalent, to the "Ammoniacal Carbonate of Copper" of the preceding page.

The solutions thus obtained differ somewhat in composition from those described on page 112. As regards copper content they are alike and the fungicide efficacy of the ammonia-copper compound is most probably the same in them all, but the last described solutions contain 4¼ oz. of sulphate of ammonia in the barrel or two barrels respectively, which is in the ratio of 1 to 970 or 1940 of liquid. This small proportion of sulphate of ammonia it may be anticipated will have no injurious effect on foliage. These solutions probably contain less free ammonia or carbonate of ammonia than those noticed on page 112 and in this respect are accordingly safer applications.

This method of preparing *Ammonia-Copper Solution* will, it is hoped, render the purchase or making of carbonate of copper and the use of liquid ammonia unnecessary. Practical trials are of course requisite to establish its usefulness and to prove what dilutions are the most proper.

*If, by long keeping, the carbonate of ammonia has become soft and opake a larger amount up to 1¼ lbs. will be needful.

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THE PROTEIDS OR ALBUMINOIDS OF THE OAT-KERNEL.*

By THOMAS B. OSBORNE, Ph.D.

I. Historical.

The Proteids contained in or derived from the oat-grain have been specially studied by J. P. Norton, Baron von Bibra and Dr. W. Kreusler. Norton† recognized three proteids, viz: 1. *Albumin*, 0.5 to 2.17 p. c., which was taken up from the "epidermis," (after starch had been mechanically removed by elutriation with slightly ammoniacal water), by boiling with acetic acid and was precipitated by neutralizing the solution. 2d. *Casein* (or *avenine*, as Johnston, in whose laboratory the work was done, named it), 15.76 to 17.72 p. c., which was dissolved in the slightly ammoniacal water used in separating starch, and thrown down by acetic acid. 3. *Glutin*, 1.33 to 2.47 p. c., extracted by alcohol and separated from oil by means of ether, and from sugar by water.

Von Bibra‡ found that no coherent gluten could be got from oat-flour by kneading in water. He recognized *Albumin*, 1.24 to 1.52 p. c., precipitated by boiling the cold-water-extract of the ground oats; *Casein*, 0.15 to 0.17 p. c., the body separating from the hot alcohol-extract on cooling; *Plant-gelatin* (Dumas' *glutin*, Taddei's *gliadin*), 3.00 to 3.25 p. c., the substance soluble both in hot and cold alcohol; and *Nitrogenous substance insoluble in water and alcohol*, 11.38 to 14.85 p. c.

Kreusler§ found *Oat-Gliadin* soluble in weak alcohol and *Oat-Legumin* soluble in very dilute alkali.

Since the date of Kreusler's work, 1869, our knowledge of proteid bodies and of the methods for their investigation has been considerably extended. This advance has been chiefly in the study of the animal proteids, but little real progress having been made in our knowledge of the vegetable albuminoids. The following research was undertaken with a view to applying the newer methods of study to the plant-proteids that have agricultural importance.

*An abstract of this Paper was read by the Author before the National Academy of Sciences, in Boston, November 13th, 1890.

† Am. Jour. of Sci. and Arts, 2d ser., iii, 330, (1845), and v, 22, (1848).

‡ Die Getreidearten und das Brod. Nürnberg, (1860).

§ Jour. für Pr. Chemie, cvii, 17, (1869).

II. Oat-Proteids extracted by Weak Alcohol.

Kreusler's Work.

The Oat-proteid soluble in weak alcohol was first examined and, as results differing from Kreusler's were obtained, it will be well to give here a brief summary of his work.

Kreusler found that, on extracting ground oats with alcohol of 80 p. c. and concentrating the extract to one-third of its volume, a considerable amount of substance separated which, after subsiding from the solution, became a tough, transparent mass of amber-yellow color. The solution decanted from this substance and further concentrated, yielded a second deposit. The liquid poured from this second deposit yielded, on still further concentration, a third. The three sediments were united and dissolved in 80 p. c. alcohol at a gentle heat. On cooling, the greater part of the substance precipitated. After decanting the liquid, this precipitate was treated with absolute alcohol, which caused it to gather on the walls of the vessel as a tenacious mass. After treating with ether and again with absolute alcohol, it was dried over sulphuric acid. This Kreusler designated A.

By concentrating the solution decanted from A, on cooling, he obtained a second precipitate B. The filtrate from B by similar treatment yielded a third precipitate C.

These three precipitates showed the same behavior with various reagents and appeared to differ only in their degree of purity. The reactions agreed with those of gliadin from wheat which, according to Ritthausen, contains 18 p. c. of nitrogen.

Kreusler found that :

A	contained	16.22	per cent.	of	nitrogen.
B	"	16.21	"	"	"
C	"	15.36	"	"	"

These three preparations were united, dissolved in dilute acetic acid and fractionally precipitated by dilute potash. Thus were obtained three precipitates:

I	with	16.00	per cent.	of	nitrogen.
II	"	16.51	"	"	"
III	was too small in amount for analysis.				

By this treatment the substance was separated into two portions of different nitrogen-content.

Kreusler in the next place prepared a new extract with alcohol of 80 p. c. from five pounds of ground oats, concentrated the solu-

tion until nearly all the alcohol was removed, and on cooling and treating the precipitate with ether and absolute alcohol and drying over sulphuric acid, obtained thirty grams of substance having properties like the former preparations, but not wholly soluble in acetic acid. This precipitate contained 15.36 p. c. of nitrogen. When it was heated with acetic acid, a residue was left, having 14.81 p. c. of nitrogen. The acetic acid solution, by three partial precipitations with dilute potash, gave, as before, precipitates I, II and III—the third being too little for analysis. The composition was:

	I.	II.
Carbon	----	53.41
Hydrogen	----	7.15
Nitrogen	16.99	17.14

This treatment, however, had failed to yield a product having as much nitrogen as Ritthausen's gliadin.

I and II were, therefore, united and dissolved in 60 p. c. alcohol at a gentle heat. The solution was brownish yellow, and on cooling, a part of the substance precipitated. The filtrate from this precipitate gave a second precipitate when treated with absolute alcohol. These precipitates were united and called A. The alcoholic filtrate contained a considerable amount of substance which was separated by concentration and gradual precipitation with absolute alcohol. This precipitate was marked B and resembled A in appearance. They contained:

	A.	B.
Carbon	----	52.64
Hydrogen	----	7.66
Nitrogen	17.71	16.70

Since the substance was precipitated in the presence of a considerable amount of acetic acid and might be thought to retain some of the latter, the just-described process was repeated with A and potash added to perfect neutralization. The precipitate thus obtained was slightly washed with water, and after dissolving in 60 p. c. alcohol was precipitated with absolute alcohol. B was dissolved directly in weak alcohol, and precipitated by absolute. These products then had the following composition:

	A.	B.
Carbon	52.94	53.12
Hydrogen	7.71	8.15
Nitrogen	17.28 17.30	17.20

These preparations were next united and dissolved by heating in 60 p. c. alcohol; a varnish-like mass deposited on cooling. This process was repeated several times, and the substance was finally dried with absolute alcohol. It had the following composition as found in analyses I and II.

			Gliadin.	
	I.	II.	Oats. Kreusler.	Wheat. Ritthausen.
Carbon	52.94	52.59	52.59	52.60
Hydrogen	7.58	7.65	7.65	7.00
Nitrogen	17.71	----	17.71	18.06
Sulphur	1.71	1.61	1.66	.85
Oxygen	20.06		20.39	21.49
	100.00		100.00	100.00

The alcoholic solution after concentrating gave on cooling a preparation with 17.2 per cent nitrogen. Kreusler rejected the highest carbon-determination (obtained without the use of lead-dioxide) as probably erroneous, and wrote his analysis of *oat-gliadin* beside Ritthausen's analysis of *wheat-gliadin*, as quoted above. Kreusler concludes that oat-gliadin is essentially different from wheat-gliadin and compares at length the behavior of the two towards reagents. The one point of difference he mentions is that the oat-gliadin dissolves in concentrated hydrochloric acid to a scarcely colored liquid, while wheat-gliadin gives a blue solution.

It is evident from Kreusler's paper that he expected to find the alcohol-soluble proteid of oats to have the same composition as wheat-gliadin. He finally accepted, as pure, a preparation having 17.71 per cent. of nitrogen, according to a single determination.

It is to be noticed on reviewing his analyses that the treatment to which Kreusler submitted his preparations, while on the whole tending to raise the nitrogen-content, sometimes appears to have had the opposite effect and the conclusion is not improbable that the fluctuations in the per cent. of nitrogen found by him are partly attributable to the then unknown errors involved in the soda-lime method of analysis—errors which Ritthausen* and U. Kreusler† in later years fully appreciated and made the subject of special investigation.

* Pflüger's Archiv., xviii, 236, (1878).

† Landw. Vs-St. xxiv, 37, (1880), und ibid, xxxi, 248, (1885).

III. Oat-Proteids extracted by Weak Alcohol.

The Writer's Work.

1. *Direct Extraction with Alcohol.* Preparations **1–8.**

As Ritthausen had separated the gliadin, mucedin and fibrin found by him in wheat gluten, from alcohol-solution by fractional precipitations, the writer judged that if more than one proteid were extracted from oats by alcohol, this fact would be shown by differences in behavior and composition of various fractions of the alcoholic extract. Accordingly four kilos. of freshly-ground oats were heated on the water bath with ten liters of alcohol, of ·915 sp. gr. After boiling for half an hour the extract was strained through cloth, the residue pressed out and the extraction repeated. The extracts were united, allowed to stand over night, decanted from sediment, and filtered clear. This solution was concentrated to one-third by distillation. After standing for twenty hours at room-temperatures, the residue deposited a bulky yellowish precipitate. About four-fifths of the solution was carefully decanted from this precipitate. The remaining one-fifth could not be filtered until a large amount of strong alcohol had been added, which caused the precipitate to separate. After filtering, the precipitate was treated with absolute alcohol, next with ether, and after removing the ether, with absolute alcohol again, and dried over sulphuric acid. This preparation, **1**, then weighed 15·5 gm. and, dried at 110° C., contained 13.92 per cent. of nitrogen. The liquid decanted from **1**, was still further concentrated to about one-third of *its* volume and cooled. The precipitate which formed, **2**, was treated with absolute alcohol and ether and, after drying over sulphuric acid, weighed 10.30 grams. Dried at 110° C., it contained 12.36 per cent. of nitrogen. The filtrate from **2** was concentrated to a thick syrup. On cooling a deposit formed on the bottom of the dish. The syrup was poured off and this deposit treated successively with strong alcohol, absolute alcohol, ether, and finally with absolute alcohol again. After drying over sulphuric acid, this precipitate, **3**, weighed 6.82 grams, and contained, when dried at 110° C., 10.37 per cent. of nitrogen.

The alcoholic liquids obtained by washing preparations **1**, **2**, and **3**, were found to have dissolved a large amount of proteid, they were therefore united and concentrated on the water-bath to small volume and cooled. The abundant deposit was washed with

absolute alcohol, ether, absolute alcohol again, and dried over sulphuric acid. The 14.62 grams thus obtained, **4**, when dried at 110° C., contained 16.27 per cent. of nitrogen. The filtrate from **4** was still further concentrated, and after cooling and adding a large amount of alcohol gave a precipitate, **5**, which when treated as the others, weighed 4.21 grams and contained 6.0 per cent. of nitrogen. The filtrate from **5** was highly concentrated and treated with absolute alcohol. The precipitate thus thrown down, **6**, after treating with absolute alcohol, ether, absolute alcohol again, and drying over sulphuric acid, weighed 17.78 grams and contained 8.61 per cent. of nitrogen.

To sum up: From the alcoholic extract by concentrating and cooling three times there resulted three preparations, viz :

1, of 15.5 grams, containing 13.92 per cent. of nitrogen.
2, of 10.30 " " 12.36 " "
3, of 6.82 " " 10.37 " "

From the alcoholic washings of **1**, **2** and **3** by concentration and cooling was obtained preparation

4, of 14.62 grams containing 16.27 per cent. of nitrogen.

And by further concentration and addition of much strong alcohol,

5, of 4.21 grams containing 6.00 per cent. of nitrogen.
6, of 17.78 " " 8.61 " "

The principal impurity recognized in these preparations was sugar, which was abundant in **5** and **6**.

These six preparations were examined separately.

1 was warmed with alcohol of 75 per cent., but was only partly soluble, and owing to its slimy nature could not be filtered. Three volumes of strong alcohol were added, making the solvent equivalent to 2 liters of about 88 per cent. alcohol. After heating to boiling and cooling, a little substance separated, which was filtered out, together with the undissolved portion. This precipitate and residue, **1. A.**, after treatment with absolute alcohol, ether, etc., as before described, weighed 3.68 grams and contained 14.57 per cent. of nitrogen.

The filtrate from **1. A.** concentrated to one-third and cooled, deposited but little substance. Addition of an equal volume of water produced a precipitate. The liquid was poured off and the deposit treated with a large amount of absolute alcohol. The

residue, **1. B.**, after drying weighed 3.05 grams, and contained 15.39 per cent. of nitrogen. Water was added to the filtrate from **1. B.**—but only a trifling precipitate resulted. The aqueous solution was then boiled, the coagulum filtered off, washed with absolute alcohol and dried over sulphuric acid. This preparation, **1. C.**, weighed 2.45 grams and contained as follows:

COAGULATED PROTEID.—*Directly extracted from Ground Oats by Weak Alcohol.*

	1. C.
Carbon	52.66
Hydrogen	6.89
Nitrogen	16.32
Sulphur, Oxygen, Ash	24.13
	100 00

Carbon and Hydrogen.—.3120 gram dried at 110° C. gave .6025 gram CO_2 = 52.66 per cent. C, and .1934 gram H_2O = 6.89 p. c. H.

Nitrogen, by Kjeldahl method.—.5624 gram dried at 110° C. gave ammonia = 10.75 cc. HCl (1 c. c. HCl = .00854 gram N) = 16.32 p. c.

Ash could not be determined for want of material.

Nothing more could be obtained out of the filtrate from **1. C.** **2.** and **3.** were united and treated with 400 c. c. of boiling alcohol of 0.9 sp. gr. A part dissolved to a deep-red solution. The residue was extracted again with hot dilute alcohol and treated in the same manner as the other preparations. Thus was obtained 9·05 grams of substance **2** and **3. A.** containing 15·47 per cent. of nitrogen.

This preparation was again treated first with hot water and then with hot alcohol of 0.9 sp. gr., but only a little dissolved and the nitrogen-content was unchanged.

The alcoholic filtrate from **2** and **3. A.** was further examined, but only 2.3 grams of substance with 7.66 per cent. of nitrogen were obtained. The long heating in very weak alcohol to which preparations **2** and **3** had been subjected, had rendered a large share of the proteid insoluble, and it was therefore lost for further purification.

4 was treated with 500 c. c. of alcohol of 0.9 sp. gr., in which a part was insoluble, **4. A.** This was washed with alcohol and ether, dehydrated with absolute alcohol and after drying over sulphuric acid weighed 8.9 grams. Its analysis follows:

COAGULATED PROTEID.—*Directly extracted from Ground Oats by Weak Alcohol.*

4. A.

Carbon	53.09
Hydrogen	6.96
Nitrogen	16.56
Sulphur, Oxygen	23.39
	100.00
Ash	.35

Ash.—.5069 gram air-dried = .4555 dried at 110° C. gave .0016 gram ash = .35 p. c.

Carbon and Hydrogen.—.4354 gram dried at 110° C. gave .8445 gram CO_2 = 52.90 p. c. C, and .2716 gram H_2O = 6.91 p. c. H.

Nitrogen by Dumas' Method.—.5425 gram dried at 110° C. gave 76.12 c.c. gas at 9°C. Barometer 756 .3^{mm} at 9° C. = 16.76 p. c. less correction of .20 = 16.56 per cent. N.

The alcoholic filtrate from **4. A.** was concentrated to small volume, but as a slimy precipitate appeared, which could not be filtered, the solution was mixed with water. This did not cause the substance to separate in a manageable form, so the liquid was boiled, and after cooling the substance deposited as a gelatinous lump. After filtering, the deposit, **4 B.**, was treated with absolute alcohol and with ether and dried over sulphuric acid. It weighed 2.6 grams. Its analysis is subjoined :

COAGULATED PROTEID.—*Directly extracted from Ground Oats by Weak Alcohol.*

4. B.

	I.	II.
Carbon	53.12	----
Hydrogen	6.91	----
Nitrogen	16.52	16.39
Sulphur, Oxygen, Ash	23.45	----
	100.00	

Ash.—Very little. Not determined for want of substance.

Carbon and Hydrogen.—.3445 gram dried at 110° C. gave .6700 gram CO_2 = 53.12 p. c. C and .2143 gram H_2O = 6.91 p. c. H.

Nitrogen.—I. By Dumas' method—.2693 gram dried at 110° C. gave 37.93 c. c. gas at 8° C. less correction of .7 c. c. Barometer 756.3 mm. at 9° C.=16.52 p. c. N.

Nitrogen.—II. By Kjeldahl method—.2693 gram substance dried at 110° C. gave ammonia = 9.68 cc. HCl (1 cc. HCl = .00854 gram N) = 16.39 p. c.

The filtrate from **4. B.** was evaporated to dryness and yielded one gram of substance containing 7.5 per cent. of nitrogen.

6. evidently contained a large amount of sugar. It was first treated repeatedly with water, in which it formed a pasty lump. This was dehydrated with absolute alcohol, and when dried over sulphuric acid weighed 7.63 gm. and contained 14.61 per cent. of nitrogen. **6. A.**

6. A. was then treated with 100 c. c. of water, with which it formed a stringy lump which, after thoroughly kneading under water, assumed a semi-liquid condition and could not be separated from the solution either by boiling or freezing. The solution after concentrating on the water-bath to about 30 c. c. was poured into 300 c. c. of absolute alcohol. This threw down a curdy white precipitate which, after treating with absolute alcohol and drying over sulphuric acid, weighed 6 gm. and contained 15.67 per cent. of nitrogen when dried at 110° C. **6. A. 1.**

6. A. 1. was treated with 500 c. c. of alcohol of 0.9 sp. gr. But little dissolved and the solution was too slimy to filter. The whole was then concentrated to one-third and cooled, but no separation took place which would allow of filtering or decanting the solution. The solution was, therefore, diluted with water and boiled. After cooling, a curdy precipitate settled out, leaving a turbid liquid. This liquid was decanted and poured into a large amount of absolute alcohol. On standing a precipitate separated which, when treated with absolute alcohol and dried over sulphuric acid, weighed .455 gm. and contained, when dried at 110° C., 16.40 per cent. of nitrogen. **6. A. 2.**

There was thus obtained of the proteid soluble in alcohol a large number of fractional precipitations with different nitrogen-content. It will be noticed, however, that five of these preparations have from 16.27 to 16.56 per cent. of nitrogen. No preparations were obtained having a higher percentage of nitrogen, and none of the other preparations approximate to a constant nitrogen-content.

4. had 16.27 per cent. of nitrogen. When this was separated into two parts, one soluble in dilute alcohol, **4. B.** and the other

insoluble, **4. A.**, the two parts were found to contain the same proportion of nitrogen, and agreed together exactly in content of carbon and hydrogen. This is what might be expected of a pure proteid, for some of these bodies become insoluble without change of composition, so far as can be detected by our methods of analysis. **1. C.** without correction for ash, has nearly the same composition as **4. A.** and **4. B.** a correction would tend to bring it into closer agreement; the amount of substance however, was insufficient for an ash-determination.

As all the preparations analyzed thus far, were the insoluble modification of the proteid, a new extract was prepared. Five pounds of freshly-ground oats were boiled up with 10 liters of alcohol of 0.915 sp. gr. The extract was pressed out, and added to another five pounds of oats and again heated to boiling. After filtering, a perfectly clear, deep ruby-red solution was obtained. This was concentrated by distillation on the water-bath to about one-third of its original volume. On cooling, a large amount of substance separated. This was thrown upon a filter and, after 24 hours, about seven-eighths of the solution passed through. The filter, with its contents, was then returned to the flask and boiled in 10 liters of 60 per cent. alcohol, with a reflux condenser, for four hours. The substance entirely dissolved to a clear, deep red solution. The solution was then concentrated by distillation to about one-half and cooled rapidly to 35° C., when it filtered readily. The precipitate formed a tough, jelly-like mass which did not adhere to the paper. It was boiled, as before, for several hours, with 10 liters of 60 per cent. alcohol until dissolved completely. The perfectly clear solution was concentrated to one-half its volume, during which operation a large part of the substance deposited on the interior of the flask as a thick, leather-like coating. This coating readily separated from the glass in large pieces of a dark-brown color. On cooling the liquid, a finely-divided yellowish precipitate appeared which did not settle out on standing. The muddy liquid was poured off and the leathery deposit was minced and treated with absolute alcohol in order, if possible, to dehydrate the substance and render it pulverizable for analysis, but as it remained 48 hours without change the attempt was abandoned. The substance suspended in the muddy liquid was now caused to separate by adding alcohol. After filtering, washing first with strong, then with absolute alcohol, the precipitate was united to the portion which had been digested with absolute alcohol and

the whole was boiled in two liters of 60 per cent. alcohol with return condenser. After three hours' boiling, about one-half had dissolved. Two liters more of 60 per cent. alcohol were then added and the boiling continued. Considerable proteid still remained in a gelatinous form on the sides of the flask. The solution was filtered off and 1200 c. c. of absolute alcohol were poured on the residual substance. This caused the jelly to break up into coarse lumps, whereupon 800 c. c. of water were added, making two liters of 60 per cent. alcohol, and the boiling on the water-bath was continued for several hours. Some of the substance dissolved, the liquid was filtered, and the insoluble residue was treated for many days with absolute alcohol. It was then ground to a fine powder while still moist with alcohol, extracted with ether, and dried over sulphuric acid. This preparation, **7.**, weighed 9.1 grams.

The alcoholic solution filtered from the insoluble portion was concentrated to one-half and filtered while hot from the large amount of substance which had separated. The latter resembled raw rubber in appearance and consistence but not in elasticity. It was finely minced, and after digesting with absolute alcohol was pulverized, treated again with absolute alcohol, washed with ether, and dried over sulphuric acid. This, **8.**, weighed 26 grams, and was a light powder of yellowish color. Unlike all the other preparations extracted from the oats by weak alcohol, which were analyzed, **8** was still largely "uncoagulated" and soluble in that solvent.

These two preparations were analyzed with the following results:

COAGULATED PROTEID.—*Directly extracted from Ground Oats by Weak Alcohol.*

	7.			
	I.	II.	III.	I. Ash-free.
Carbon	52.98	----	----	53.10
Hydrogen	6.86	----	----	6.87
Nitrogen	16.34	16.41	16.39	16.39
Sulphur, Oxygen	----	----	---	23.64
Ash	.25	----	----	----
				100.00

Ash.—1.007 gm. air-dried substance =.9291 gm., dried at 110° C. gave .0023 gm. Ash = .25 p. c.

Carbon and Hydrogen.—.5076 gm. dried at 110° C., gave .9860 gm. CO_2 = 52.98 p. c. C, and .3131 gm. H_2O = 6.86 p. c. H.

Nitrogen, I. Dumas' Method—.5000 gm. air-dried = 4606 gm. dried at 110° C. gave 64.1 cc. gas at 8° C. Barometer 750 mm., at 15° C. = 16.54 p. c. less .20 found in blank = 16.34 p. c. N.

Nitrogen, II. Kjeldahl Method—.5000 gm. air-dried = .4606 gm. dried at 110. C., gave ammonia = 8.85 cc. HCl (1 cc. HCl = .00854 N) = 16.41 p. c.

III.—.5000 gm., air-dried = .4611 gm., dried at 110° C., gave ammonia = 8.85 cc. HCl = 16.39 p. c. N.

SOLUBLE PROTEID.—*Directly extracted from Ground Oats by Weak Alcohol.*

8.

	I.	II.	III.	IV.	I. Ash-free.
Carbon	52.92	----	----	----	53.06
Hydrogen	6.93	----	----	----	6.94
Nitrogen	16.33	16.33	16.45	16.54	16.38
Sulphur	2.25	2.21	----	----	2.26
Oxygen	----	----	----	----	21.36
Ash	.24	----	----	----	----
					100.00

Ash.—1.0045 gm. air-dried, equal to .9027 gm. dried at 110° C., gave .0022 gm. ash = .24 p. c.

Carbon and Hydrogen.—.4821 gm. dried at 110° C., gave .9356 gm. CO_2 = 52.92 p. c. C., and .3003 gm. H_2O = 6.93 p. c. H.

Nitrogen, I.—Dumas' Method.—.5000 gm. air-dried = .4554 gm., dried at 110° C., gave 63.1 cc., gas at 10° C. Barometer 759.5 mm. at 16° C. = 16.53 p. c., less correction .20 = 16.33 p. c. N.

II.—.5000 gm. = .4490 gm., dried at 110° C., gave 62.42 cc. gas at 14° C. Barometer 770.3 mm., at 17° C. = 16.53 p. c. Corrected = 16.33 p. c. N.

III.—Kjeldahl Method.—.5000 gm. = .4490 gm., dried at 110° C., gave ammonia = 8.65 cc. HCl (1 cc. HCl = .00854 gm. N) = 16.45 p. c. N.

IV.—.5000 gm. = .4490 gm., dried at 110° C., gave ammonia = 8.70 cc. HCl = 16.54 p. c. N.

Sulphur, I.—1. gm., air-dried = .9107 gm., dried at 110° C., gave .1850 gm. $BaSO_4$, which when fused with Na_2CO_3 and reprecipitated, gave .1495 gm. $BaSO_4$ = .20532 gm. Sulphur = 2.25 p. c.

II.—1. gm. = .9107 gm., dried at 110° C., gave .1575 gm. $BaSO_4$, which, when fused with Na_2CO_3, and reprecipitated, gave .1469 gm. $BaSO_4$ = .20175 gm. Sulphur = 2.21 p. c.

These analyses are observed to agree closely with each other, as well as with several of the preparations obtained under various conditions from the first extract already described, as is shown by the following table.

OAT-PROTEID EXTRACTED BY WEAK ALCOHOL.

	Soluble.	Coagulated					
	8	7	1C*	4A.	4B.*	4	6A.2*
Carbon	53.06	53.10	52.66	53.09	53.12	----	----
Hydrogen	6.94	6.87	6.89	6.96	6.91	----	----
Nitrogen	16.38	16.39	16.32	16.56	16.52	16.27	16.40
Sulphur	2.26	23.64	24.13	23.39	23.45	----	----
Oxygen	21.36					----	----
	100.00	100.00	100.00	100.00	100.00		

* Not corrected for ash.

The figures given by Kreusler for the nitrogen of two precipitates from his first alcoholic extract are likewise in close agreement with the above, viz :—16.22 and 16.21 p. c. From his "oat-legumin" Kreusler also extracted by means of alcohol a substance with 16.38 p. c. nitrogen.

It seems hardly probable that such concordant analyses could result from impure preparations or from a mixture of two or more proteids, especially in view of the varying conditions under which the preparations were obtained.

The very high content of sulphur is remarkable. No other analysis of a vegetable proteid approaches this amount. Ritthausen (Pflüger's Archiv., Bd. xxi, p. 95, 1880), found indeed in a single preparation from sesame press-cake, 2.36 p. c., but he attributed this high percentage to some foreign substance precipitated with the proteid. He afterwards (Jour. f. Pr. Chem., 1882, Bd. xxvi, p. 444), stated the percentage of sulphur as 1.25, and ascribed the high figure first obtained to calcium sulphate. Among the animal-proteids besides *Keratin*, some forms of human *serum-albumin* contain 2.3 p. c. of sulphur.*

The fact that sulphur in my analyses is .60 p. c. more than found by Kreusler in his gliadin, indicates that his substance had undergone chemical change during the processes of preparation.

Ritthausen believes to have obtained from wheat-gluten by extracting with alcohol, three distinct proteids, to which he applies the names fibrin, gliadin and mucedin, and he includes under one or the other of these terms all the alcohol-soluble proteids which he and Kreusler found in their extended study of the cereals. That portion of wheat-gluten which is insoluble in alcohol Ritthausen denominated *gluten-casein.*

On the authority of Ritthausen, his names and the composition attributed by him to these substances, have passed into chemical literature and have superseded the mostly different designations and analyses of the older investigators.

The alcohol-soluble proteid of the oat which I have obtained, differs, however, essentially in composition from all these preparations of Ritthausen and Kreusler. Kreusler's analysis of mucedin from barley-grits alone fairly agrees with my results, as respects carbon, hydrogen and nitrogen, but the same chemist's analysis of mucedin from barley-meal gives .84 p. c. higher nitrogen than that from grits and but .68 p. c. sulphur.

* Starke. Jahresbericht der Thier-Chemie, xi, p. 19 (1881),

In case of the other substances the discrepancies are still more decided. The properties and reactions given by Kreusler for the substance called by him oat-gliadin are true of the body just described, but these reactions mostly belong to proteids in general, or to the mucedin and fibrin of Ritthausen, and are not characteristic of any one body. Ritthausen states that on evaporating the alcohol-solution of the gluten-fibrin prepared by him from wheat-gluten, a pellicle forms on the surface which renews itself as often as removed, and that neither mucedin nor gliadin show this property. I have frequently observed the formation of films on evaporating solutions of the alcohol-soluble proteid from oats. This body, however, can not be a mixture of Ritthausen's fibrin and gliadin as its sulphur-content so largely exceeds theirs.

2. *Extraction with Alcohol after treatment with Water.* Preparation 9.

Five pounds of oats were treated with water as long as any proteid was dissolved. The residue was then twice extracted with alcohol and strongly pressed. The first alcoholic extract was evaporated so far as to remove nearly all the alcohol. On cooling, the solution became turbid and after standing deposited a brown slimy substance exceedingly soluble in dilute alcohol. The liquid was decanted and the precipitate dissolved in dilute alcohol. After evaporating off the alcohol and cooling, the substance separated as before; the now aqueous solution was decanted and the slimy residue treated with ether. Ether extracted a fatty oil from this material and caused it to assume a more solid consistence. The substance was then treated with alcohol of 93 p. c. which dissolved a little and converted the remainder into a solid lump so that it could be transferred to a flask and digested with ether. By the continued action of ether the viscid substance was transformed into a loose yellowish powder. After standing under ether for 24 hours the body was filtered out and dissolved in dilute alcohol. This alcoholic solution was filtered and evaporated on the water-bath to a small volume. After cooling, the solution was poured from the gummy substance adhering to the dish, which was washed with water and repeatedly digested with absolute alcohol. As long as the substance retained water, a little dissolved during treatment with alcohol. The

residue became granular and brittle and was easily reduced to a fine powder. When impregnated with absolute alcohol the mass absorbed moisture rapidly from the air and became soft and viscid.

After thorough dehydration with absolute alcohol, the substance was rapidly filtered out and dried over sulphuric acid. It weighed 7.88 grams.

In testing the purity of this substance it was found to yield something to water. The whole preparation was, therefore, washed out completely with distilled water and again treated with absolute alcohol and ether and dried over sulphuric acid. Analysis of this preparation, **9.** gave the following results :

SOLUBLE PROTEID—*Extracted by Weak Alcohol from Ground Oats after treating them with Water.*

9.

	I.	II.
Carbon	53.64	----
Hydrogen	6.88	----
Nitrogen	15.70	15.36
Sulphur	1.75	----
Oxygen	22.03	----
	100.00	

Ash—.6007 gm. air-dried left no ash.

Carbon and Hydrogen—.5886 gm. dried at 110° C. gave 1.1579 gm. CO_2=53.64 p. c. C. and .3642 gm. H_2O=6.88 p. c. H.

Nitrogen. I. Dumas' method—.5000 gm. air-dried =.4479 gm. dried at 110° C. gave 60.68 cc. gas at 8° C. Barometer 757 mm. at 12° C. =15.90 p. c. N, less .20 for blank =15.70 p. c.

II. Kjeldahl method—.5000 gm. air-dried =.4479 gm. dried at 110° C. gave ammonia =8.05 cc. HCl (1 cc. HCl=.00854 gm. N.)=15.36 p. c.

Sulphur—.8958 gm. dried at 110° C. gave .1142 gm. $BaSO_4$=.0157 gm.=1.75 p. c. sulphur.

3. Extraction with Alcohol after treatment with Salt-Solution. Preparations **10** and **11.**

Five pounds of oats were repeatedly treated with 10 per cent. solution of sodium chloride until nothing more was dissolved, and after pressing out as thoroughly as possible, the residue was twice treated with alcohol of .912 sp. gr., being pressed out each time and the extracts kept separate. The first and second alcohol-extracts were united, evaporated on the water bath, until all alcohol had escaped and the residue was cooled to 10° C. At this

temperature the deposit formed brittle lumps which, after decanting the solution, were treated with ether and absolute alcohol. The lumps were thus brought into a granular state, in which condition the substance was treated for some time with ether until all fat was removed. It was then dissolved in hot dilute alcohol, filtered and evaporated on the water-bath to a small volume. On cooling the proteid separated in a mass on the bottom of the dish. The aqueous liquid was poured off and the residue treated with absolute alcohol and ether, whereupon it became brittle and was easily ground to a fine powder. This powder was washed with water until it no longer gave with silver nitrate a reaction for chlorine. It was then treated with absolute alcohol and dried over sulphuric acid. In appearance and behavior it resembled in all respects the substance extracted by alcohol after the oats had been treated with water. When analyzed it was found to have the composition stated under **10.**

The third alcoholic extract of the oats was treated in the same way, and the product obtained analyzed with the following results, **11:**

SOLUBLE PROTEID—*Extracted by Weak Alcohol from Ground Oats after treating them with Salt-Solution.*

	10.			**11.**	
	I.	II.	III.	I.	II.
Carbon	53.97	----	----	53.55	----
Hydrogen	7.14	----	----	6.80	----
Nitrogen	15.71	15.66	15.68	15.61	15.52
Sulphur	1.80	----	----	} 24.04	----
Oxygen	21.38	----	----		
	100.00			100.00	
Ash	.56			.25	

Details of Analyses of **10.**

Ash—1 gm. air-dried =.9361 gm. dried at 110° C. gave .0053 gm. ash =.56 p. c.

Carbon and Hydrogen—.3443 gm. dried at 110° C. gave .6780 gram CO_2=53.70 p. c. C, and .2200 gm. H_2O=7.09 p. c. H.

Nitrogen—I. Dumas' Method—.5000 gm. air-dried =.4681 gm. dried at 110° C. gave 60.47 cc. gas at 8° C. Barometer 772 mm. at 8° C.=15.80 p. c. less .20 for blank =15.60 p. c. N.

II. Kjeldahl Method—.5000 gm. air-dried =.4681 gm. dried at 110° C. gave ammonia =8.53 cc. HCl (1 cc. HCl =.00854 gm. N.)=15.57 p. c. N.

III. .5000 gm. gave ammonia 8.55 cc. HCl=15.59 p. c. N.

Sulphur—1 gm. air-dried substance =.9361 gm. at 110° C. gave .1232 gm. $BaSO_4$=.0169 gm.=1.80 p. c. Sulphur.

Details of Analyses of **11.**

Ash—.8680 gm. dried at 110° C. gave .0022 gm. ash=.25 p. c.

Carbon and Hydrogen—.3676 gm. dried at 110° C. gave .7190 gm. CO_2=53.42 p. c. C, and .2242 gm. H_2O=6.78 p. c. H.

Nitrogen—I. Kjeldahl Method—.5000 gm.=.4715 gm. dried at 110° C. gave ammonia=8.60 cc. HCl (1 cc. HCl=.00854 gram N)=15.59 p. c. N.

II. .5000 gm.=.4715 gm. dried at 110° C. gave ammonia=8.55 cc. HCl=15.49 p. c. N.

4. Extraction with Alcohol after treatment with Water and Salt-Solution. Preparation **12.**

Five pounds of oats were extracted with water and then with 10 p. c. salt-solution as long as anything was removed. The residue was twice digested with alcohol of .9 sp. gr., the two alcohol-extracts were united and concentrated to a small volume on the water-bath. After cooling, the substance which deposited was filtered out and dissolved in dilute alcohol. The filtered solution was evaporated until nearly all the alcohol was expelled and finally poured into cold water. The abundant precipitate thus produced settled rapidly, forming a pasty mass on the bottom of the dish, from which the water could be completely decanted. By treatment with ether and absolute alcohol the substance was rendered dry and brittle, and was easily ground to a yellowish powder. This was transferred to a flask and digested for 24 hours with a mixture of absolute alcohol and ether, then washed with ether to remove the alcohol and dried in the air. The product weighed 12 grams. After dissolving this preparation in dilute alcohol and evaporating to a small volume on the water-bath, the concentrated solution was poured into a liter of cold distilled water. The substance thus precipitated was washed by decantation with distilled water until all chlorides were removed, then treated with absolute alcohol and ether and dried over sulphuric acid. This preparation was found to have the following composition :

SOLUBLE PROTEID—*Extracted by Weak Alcohol from Ground Oats after treating them with Water and with Salt-Solution.*

12.

	I.	II.
Carbon	53.63	----
Hydrogen	7.16	----
Nitrogen	15.83	15.86
Sulphur	1.74	----
Oxygen	21.64	----
	100.00	
Ash	.11	

Ash—.7593 gm. dried at 110° C. gave .0008 gm. ash = .11 p. c.

Carbon and Hydrogen—.2850 gm. dried at 110° C. gave .5595 gm. CO_2 = 53.58 p. c. C, and .1836 gm. H_2O = 7.15 p. c. H.

Nitrogen—I. Dumas Method—.4168 gm. dried at 110° C. gave 56.95 c. c. N at 18° C. Barometer 764.5^{mm} at 22° C. = 15.81 p. c.

II. Kjeldahl Method—1.0183 gm. dried at 110° C. gave ammonia = 19.63 c. c. HCl (1 cc. HCl = .00822 gm. N) = 15.84 p. c.

Sulphur—.9682 gm. dried at 110° C. gave .1218 gm. $BaSO_4$ = .01673 gm. sulphur = 1.74 p. c.

Recapitulation.

The following statement brings together the analyses of the four preparations last described.

PROTEID EXTRACTED FROM OATS BY WEAK ALCOHOL.

After treatment of the meal with—

	Water.	Salt-solution.		Water and Salt-sol.	
	9.	10.	11.	12.	Average.
Carbon	53.64	53.97	53.55	53.63	53.70
Hydrogen	6.88	7.14	6.80	7.16	7.00
Nitrogen	15.70	15.71	15.61	15.83	15.71
Sulphur	1 75	1.80	24.04	1.74	1.76
Oxygen	22.03	21.38		21.64	21.83
	100.00	100.00	100.00	100.00	100.00

When the above analyses are compared, as below, with those of the preparations obtained without previous treatment of the oats with water or salt-solution, it is evident that we have in hand two quite different and distinct substances, neither of which agrees in composition with Kreusler's *Oat-Gliadin.*

PROTEID EXTRACTED FROM OATS BY WEAK ALCOHOL.

	Without action of water or Salt-Solution.	After action of water or Salt-Solution.
	8.	Average.
Carbon	53.06	53.70
Hydrogen	6.94	7.00
Nitrogen	16.38	15.71
Sulphur	2.26	1.76
Oxygen	21.36	21.83
	100.00	100.00

The differences in behavior of the two substances are much more marked than those of composition. The body extracted by

alcohol without the previous treatment with water becomes insoluble in alcohol with great readiness and after having been dissolved and precipitated a few times is again dissolved very slowly and only in a large amount of hot alcohol of .9 sp. gr. When wet with absolute alcohol it can be exposed to moist air without becoming gummy.

On the other hand, the body extracted by alcohol after the action of water or 10 p. c. salt-solution shows no tendency to become insoluble even after long heating with very dilute alcohol. It is freely soluble even in cold alcohol of .9 sp. gr., and when wet with absolute alcohol it immediately attracts moisture from the air, becoming sticky and viscid. In appearance the two bodies do not materially differ, both being light yellowish powders when prepared as described.

Both these substances are soluble in dilute acids and alkalies to solutions from which on neutralization they precipitate, retaining solubility in dilute alcohol.

The fact that weak alcohol acts as a solvent on these bodies, which are insoluble in either pure (absolute) alcohol or pure water, is doubtless due to the formation of hydrates that, while insoluble in water, are soluble in alcohol, but that cannot exist in strong alcohol, being thereby dehydrated.

The proteid whose composition is expressed by analysis **8**, was first obtained by Norton, who extracted ground oats directly with hot alcohol, distilled the solution carefully to dryness, dissolved out the oil by ether and the salts and sugar by water. Norton designated this body *Glutin*, and considered it "analogous to the glutin of wheat;" he states that the preparation which he thus separated and weighed was no longer soluble in alcohol, but he did not attempt any further investigation of its properties or composition (*Am. Jour. Sci.*, 2d Ser., III. 229).

Von Bibra who found in oats 3.00 p. c. of *Plant-gelatin* (Pflanzenleim), does not describe its mode of preparation, but states that it contained 15.6 p. c. of nitrogen.

Kreusler indeed extracted crushed oats directly by 80 p. c. alcohol, and in his first preparations, found 16.22 and 16.21 p. c. of nitrogen ; but the substance, from whose analysis he decided upon the composition of *Oat-gliadin*, had been "purified" by dissolving in acetic acid and precipitating by potash-solution, and according to his results, contained 1.3 p. c. more nitrogen, 0.65 p. c. more hydrogen and, 0.6 p. c. less sulphur than exists in either of the alcohol-soluble proteids which I have analyzed.

It would be premature to attempt a revision of the nomenclature of these proteids until after re-investigating the alcohol-soluble proteids of the other cereals.

IV. Proteids extracted by Water.

The water-extract of freshly ground oats has a strong acid reaction. The acidity measured by litmus is much less than by phenol-phthalein. 100 cc. of an aqueous extract became neutral to delicate litmus paper after adding 10 cc. of 2-tenths p. c. KOH solution, and 5 cc. more of the same solution were added before phenol-phthalein showed an alkaline reaction. On neutralizing the water-extract of oats with 2-tenths p. c. potash, using phenol-phthalein as an indicator, a considerable precipitate appeared which was soluble in the slightest excess either of alkali or of the acid contained in the extract. This neutralization-precipitate indicates the presence of so-called *Acid-albumin.* The perfectly neutralized solution when heated to boiling remained clear. On adding 10 p. c. of sodium chloride to the neutralized and filtered liquid a considerable precipitate formed upon boiling as well as on the addition of acetic acid. When the unneutralized extract was boiled and the resulting coagulum filtered off, neither sodium chloride nor acetic acid gave a precipitate in the filtrate on boiling. The substance remaining in solution after neutralization, but precipitated by boiling, in the presence of sodium chloride or on the addition of acetic acid, is a *Globulin,* to be described later.

The water-extract, when heated slowly in a test tube immersed in a beaker of water which in turn was set in a larger beaker of water, showed a turbidity first at 57° C. and minute flocks appeared at 64° C. Heated to 70° and filtered, the solution remained clear until raised to boiling, when a slight precipitate formed. When 10 p. c. of sodium chloride was added to the extract, the turbidity appeared at 44° C. and flocks formed at 64° C.

Five pounds of oats were treated with 6 liters of water for 24 hours, pressed out and extracted a second time for 24 hours with the same amount of water. The aqueous extract reacted strongly acid to litmus, but was not neutralized as the possible action of the acid was kept in mind and the immediate object in view was to find what substances were extracted by the use of water

alone. The two extracts were united, saturated with commercial ammonium sulphate and the precipitate thereby resulting was filtered off, and scraped from the filter, the paper was washed out with water, the solution being added to the dark olive-green precipitate which partly dissolved to a brown solution. After the solution and suspended precipitate had dialyzed for 14 days in a stream of running water, thymol being added to prevent decomposition, the solution was found to be nearly free from sulphate. The contents of the dialyzer were then filtered from a dark green precipitate which had not dissolved on removing the salts. The filtrate was found not to coagulate on boiling and was evaporated to dryness on the water-bath, leaving a brown residue which weighed between 1 and 2 grams and gave the following reactions.

With the biuret test it yielded a red-purple color, of a bluer tint than given by peptones or albumose, which increased on standing. Millon's reagent with the aqueous solution gave a strong reaction. Alcohol of .9 sp. gr. dissolved a portion which, after removal of the alcohol, was readily soluble in water and reacted for proteids with Millon's reagent and the biuret test. After evaporation of the alcohol on the water-bath, the substance was but partially soluble in water. The alcoholic solution was precipitated by adding stronger alcohol. Fehling's solution gave no reaction until after heating with dilute acid, when a very slight precipitate of Cu_2O appeared. Very dilute HCl gave no precipitate in the solution, and stronger acid made a slight turbidity. These reactions indicate presence of a *Proteose* and absence of true *albumin.*

The substance remaining after dialyzing the ammonium sulphate precipitate was treated with 10 p. c. brine of sodium chloride; the resulting solution was filtered off and dialyzed till free from chlorides. Nothing precipitated on removal of the salt, the proteid being soluble in water. This fact shows that no globulin had been extracted from the substance which separated on dialysis of the aqueous extract, the globulin having been converted into an insoluble form. This dialyzed solution was not coagulated by boiling, and was therefore evaporated to dryness on the water-bath. The residue, weighing about 1 gram, was not quite completely soluble in water. As much as possible was dissolved in a small amount of water, and filtered from a slight residue. The solution was colored deep yellow-brown, contained a trace of chlorides, gave no precipitate with hydrochloric acid,

either very dilute or strong. No biuret reaction was discernible in the colored solution, which gave the proteid coloration with Millon's test, and did not reduce Fehling's solution before treatment with acids. On long standing, after heating with HCl, a little Cu_2O separated. Evidently this substance is the same (*proteose?*) as that obtained from the solution remaining after dialyzing the ammonium sulphate precipitate.

The substance remaining after dialysis and insoluble both in water and in 10 p. c. brine was found to be partly taken up in $\frac{1}{2}$ p. c. sodium carbonate solution, and in dilute hydrochloric acid, being the result of the alteration of globulin, which had passed into solution, by means of the salts derived from the oats. The neutralization-precipitate from sodium carbonate solution was slightly soluble in 10 p. c. brine of sodium chloride. The fact that the ammonium sulphate used in this work was crude and had a slightly acid reaction and a bluish tint, to which the green color of the precipitate was due, may throw doubt on the results here recorded, but as they were mostly corroborated on repeating the trials with pure and neutral ammonium sulphate, I have given them in detail.

The results of a second examination of water-soluble proteids here follow. Five pounds of oats were treated with 7 liters of water for 48 hours, thrown on a sieve, the residue pressed out and treated for a short time with 6 liters more of water. The two extracts were united and allowed to settle, when the nearly clear liquid was syphoned off and saturated with pure ammonium sulphate. After the white precipitate thus produced had stood over night, it separated in large flocks from the liquid, and was filtered out and dissolved mostly in 10 p. c. NaCl-brine, filtered and the clear solution dialyzed. The precipitate was not completely soluble in 10 p. c. NaCl-brine nor in water, in these respects resembling the precipitate obtained from the first extract after it had been dialyzed. The clear filtered solution in 10 p. c. NaCl-brine, on standing slowly deposited a part of the dissolved substance. The solution, with the precipitate which had formed, was dialyzed until free from salts, and the solution after filtering again was evaporated to dryness on the water-bath, leaving a residue of 1.11 grams. The precipitate filtered out was quite small in amount. The total proteid obtained by saturating with ammonium sulphate was less than that got in the first extraction, probably because the oats were allowed to stand twice as long in con-

tact with water as in case of the first extract, for it was found that the clear, filtered extract of the ammonium sulphate precipitate in 10 p. c. NaCl-brine, on standing deposited the dissolved substance, so that before the conclusion of the dialysis nearly all the proteid originally soluble in water had lost its solubility.

Weyl states that water converts vegetable globulins into "albuminates," that is into forms no longer soluble in salt-solutions but soluble in 1 p. c. Na_2CO_3 solution, or .8 p. c. HCl, and that a long continued action of water finally converts the albuminates thus produced into modifications that are no longer soluble in 1 p. c. Na_2CO_3 solution, or .8 p. c. HCl. They are then not to be distinguished from "coagulated proteids." This latter change he has observed only for the globulins of peas and oats.

Transformations of this character occurred in the two extracts just described. In the first, after dialysis, the residue insoluble in 10 p. c. NaCl-brine, was partly soluble in $\frac{1}{2}$ p. c. Na_2CO_3 solution, and in the second a body was formed insoluble in water, and in 10 p. c. NaCl-brine but soluble in $\frac{1}{2}$ p. c. Na_2CO_3 solution.

To sum up—We have in the aqueous extract of the oat kernel the following bodies :

1. An *Acid-Albumin*, precipitated by exact neutralization of the extract.

2. One or more *Globulins*, precipitated from the neutralized extract, by sodium chloride and acetic acid ; also precipitated by saturation with ammonium sulphate ; remaining insoluble in water on dialysis, being, as it would appear, by the action of water, converted into an "albuminate."

3. A *Proteose*, remaining in solution after dialysis of the ammonium sulphate precipitate. This body exists also in the dialyzed solution of the ammonium sulphate precipitate from the sodium-chloride extract.

V. Proteids extracted by Cold Sodium Chloride Solution.

1. Direct Extraction with Salt Solution. Preparations **13** and **14.**

Freshly ground oats extracted with 10 p. c. brine of sodium chloride* at 15°–20°, gave a brown solution which, when filtered clear, coagulated as follows : Heated to 42° C. a very slight tur-

* The sodium chloride employed, was the "Diamond Crystal Table Salt," Eureka Salt Company, New York, which is "remarkably free from impurities."

bidity formed, which increased very slowly up to 57°, at which temperature it was still slight. Above this point it increased more rapidly, at 61° the solution being opaque, at 72° flocks formed. Heated at 73° some minutes and then filtered, the filtrate became turbid again at 70°, the turbidity increasing somewhat up to 87°; from 87° to 90° the increase was more rapid, but the amount separated at 90° was small. The solution heated to 90° and filtered, became turbid again at 85° with little change up to 97°. Heated to boiling for a short time and filtered, the filtrate gave an abundant precipitate with acetic acid.

Dilute acetic or hydrochloric acid yields a large precipitate in the brine extract, which is insoluble in a slight excess of the acid. Either saturation with sodium chloride or dilution with water throws down a copious precipitate. The precipitate produced by water, on standing in the dilute salt solution two days, becomes insoluble in 10 p. c. sodium chloride brine and in ½ p. c. sodium carbonate solution.

Saturation with ammonium sulphate completely precipitates the proteids from this solution in 10 p. c. sodium chloride brine.

Five pounds of freshly ground oats were treated twice with 10 p. c. sodium chloride solution, and after filtering, the extract was saturated with commercial but perfectly neutral ammonium sulphate, which gave a dark greenish color to the extracted substances without otherwise affecting their properties. The bulky precipitate was filtered off, suspended in water and dialyzed 14 days, until nearly free from sulphates.

A heavy precipitate remained undissolved. This was filtered out and the filtrate and precipitate were separately examined.

Filtrate.—When heated very slowly in a test tube, in the manner previously described, the solution was found to become turbid at 58° C.; at 70° C. flocks were formed. Heated to boiling and filtered, the filtrate gave a strong reaction with Millon's reagent. The entire solution was therefore concentrated to a small volume at 40° C. and dialyzed until all salts were removed. The coagulation-point of the solution was again taken and found to be the same as before; turbidity at 58° C.; flocks at 73° C. The solution was strongly colored, appearing almost black by reflected light, and by transmitted light a greenish brown. It gave good biuret and Millon's reactions; was not affected by very dilute hydrochloric acid but was precipitated by stronger acid in the cold. Fehling's solution suffered no reduction, either before

or after the action of acid. This solution was then evaporated on a plate below 50° C. and yielded about 6 grams of a very brittle, greenish-black shining substance, very soluble in water, from which alcohol of .9 sp. gr. dissolved some proteid.

It is seen that when oats are extracted with 10 p. c. NaCl-solution, a substance soluble in water and coagulating at 58° to 73° C. is formed, which does not exist in the oats originally, for the aqueous extract, when treated in the same way, yields no substance coagulable even upon boiling.

The amount of this coagulable proteid, which has the properties characteristic of an *Albumin*, was too small for analysis (0.5 gram from 2¼ kilos. of oats) but its importance in a study of these bodies is great, for Weyl has undertaken to classify the vegetable proteids after the manner now commonly adopted for those of animal origin, and has stated that the extracts of oats and other seeds in 10 p. c. NaCl-solution coagulate at 55° to 60° C. and consequently contain a *myosin*, since the myosin from animal muscle coagulates under these conditions at this temperature. He also states that besides myosin, *vitellin* exists in these seeds, as shown by filtering out the coagulum formed at 60° C. and heating the solution gradually to 75°, when a second coagulation takes place.

The salt-soluble proteid to be described further on, was found, when dissolved in a 10 p. c. NaCl-solution, to become turbid at 81° C. and to form flocks at 97°. This then has a coagulation-point not far from that of vitellin, but it differs from vitellin, in being readily precipitated by sodium chloride even before saturation.

It is seen from the experiments above described that the presence of a very little coagulable substance may be highly misleading, and gives no certain basis for classifying or identifying the vegetable proteids unless each body is separated from all the others and examined in detail by itself. Weyl did not attempt this except for one preparation from the Brazil nut (*Bertholletia*), and therefore his conclusions based on coagulation-points need further study before they can be accepted.

Precipitate.—The precipitate from the dialyzer, filtered out of the solution just considered, was treated with 10 p. c. NaCl-solution. A part of the substance which did not dissolve was filtered out and the clear filtrate dialyzed till free from chlorides when the proteid was found to be precipitated. This precipitate was filtered out, washed with water, absolute alcohol and ether and dried over sulphuric acid.

The *Globulin* thus obtained, **13**, had the following properties:

In 10 p. c. brine of sodium chloride it dissolved readily to a clear solution. Addition of an equal volume of water to this solution produced a copious precipitate. Addition of sodium chloride gave a large precipitate even before saturation. When the solution was diluted till turbid the turbidity disappeared on warming gently.

Very dilute acetic or hydrochloric acid dissolved the substance readily when salts were not present. The addition of more acid gave no precipitate. Addition of a *very* little sodium chloride to a solution of the substance in very dilute acid made a slight precipitate; the addition of more sodium chloride threw down an abundant curdy precipitate. The more acid present, the more salt-solution was required to produce a precipitate, and the more salt-solution present, the less the amount of acid required for precipitation.

Dilute solution of citric acid in water (1 : 2000) gave results like acetic acid and dissolved the substance readily to a solution which was *not* coagulated on boiling.

From solution of the substance in 10 p. c. brine, hydrochloric acid throws down a precipitate which is wholly insoluble even in strong solution of sodium carbonate (the filtrate giving no biuret-reaction), and is also insoluble in an excess of dilute acid. Acetic acid on the other hand gives a precipitate which, at first, is readily soluble in *very* dilute sodium carbonate, but the solution, on standing, becomes turbid.

Hydrochloric acid, in the presence of salt, converts this proteid into a "coagulated proteid," acetic and citric acids transform it into an "albuminate."

The preparation gave the usual reactions with Millon's reagent, with cupric sulphate and potash, and with nitric acid. The solution in 10 p. c. brine of sodium chloride, on heating became turbid at 81° C. and at 97° C. the formation of flocks occurred. The same solution allowed to stand at summer temperature for more than a month, showed no signs of turbidity, decomposition being prevented by adding from time to time a drop of a 20 p. c. alcoholic solution of thymol. The composition of this globulin is given on the next page.

OAT-GLOBULIN—*First direct extraction with* 10 *per cent. Salt-Solution.*

	13. I.	II.	III.	I. Ash-free.
Carbon	52.23	52.22	----	52.32
Hydrogen	7.15	6.99	----	7.19
Nitrogen	16.92	17.07	16.90	16.95
Sulphur	.88	----	----	.88
Oxygen	----	----	----	22.66
Ash	.20	----	----	----
				100.00

Ash.—.7937 gm. gave .0015 gm. ash = .20 p. c.

Carbon and Hydrogen.—I. .3561 gm. gave .6822 gm. CO_2 = 52.23 p. c. Carbon and .2300 gm. H_2O = 7.15 gm. Hydrogen.

II. .4584 gm. gave .8778 gm. CO_2 = 52.22 per cent. Carbon and .2883 gm. H_2O=6.99 per cent. Hydrogen.

Nitrogen.—I. Dumas' Method—.6225 gm. gave 90.85 c. c. Nitrogen at 18° C., Barometer 765.5 mm. at 22° C. = 16.92 p. c.

II. Kjeldahl Method—.5760 gm. gave ammonia = 11.95 c. c. HCl. (1 c. c. = .00822 gm. N.) =17.07 p. c.

III. 1.0476 gm. gave ammonia = 21.54 c. c. HCl =16.90 p. c.

Sulphur.—.8022 gm. gave .0513 gm. $BaSO_4$ = .00705 gm. Sulphur = .88 p. c.

A second preparation of Globulin was as follows: Five pounds of ground oats were digested with 8 liters of 10 p. c. sodium chloride solution for 48 hours and pressed out. The residue was again subjected to the same treatment. The two extracts were united, filtered, the clear filtrate saturated with pure ammonium sulphate, and the precipitate thus produced was filtered off. This precipitate was found to be completely soluble in 10 p. c. salt-solution, save a slight turbidity, which was readily cleared up by very dilute sodium carbonate solution. It was therefore removed from the filter, suspended in water and dialyzed for 11 days, whereby the salts were nearly all removed. The precipitate was filtered off and the filtrate and precipitate were separately examined.

Filtrate.—The clear brown filtrate was evaporated to dryness at 50°, leaving an amber-brown, instead of a greenish-black, residue, as was obtained from the first salt-extract.

The properties of this residue agreed exactly with those from the first salt-extract, the difference in color being due to impurities in the ammonium sulphate used in saturating the first extract.

Precipitate.—The precipitate in the dialyzer was found to remain almost entirely soluble in salt solution, the trifling residue not taken up by that solvent yielded to dilute sodium carbonate,

and when this solution was neutralized with a slight excess of acetic acid the separated substance dissolved in solution of common salt.

The dialyzed precipitate was therefore filtered, washed by decantation with water, alcohol, ether, and absolute alcohol, and dried over sulphuric acid. This body had all the properties of the one similarly prepared and already described, **13.** Twenty grams of substance were thus obtained and by extracting the Oat-residue with 10 p. c. sodium chloride solution, until no more proteid was taken up, and proceeding as just detailed, ten grams more of globulin were secured. The yield was accordingly 1.3 p. c. of the air-dry oats. The analyses of this preparation here follow.

OAT-GLOBULIN—*Second direct Extraction with* 10 *per cent. Salt-Solution.*

14.

	I.	II.	III.	I. Ash-free.
Carbon	52.28	52.33	----	52.37
Hydrogen	7.23	7.17	----	7.24
Nitrogen	16.78	16.90	17.01	16.81
Sulphur	.89	----	----	.89
Oxygen	----	----	----	22.69
Ash	.21	----	----	----
				100.00

Ash.—.8060 gm. gave .0017 gm. ash = .21 p. c.

Carbon and Hydrogen.—I. .2894 gm. gave .5545 gm. CO_2 = 52.28 p. c. Carbon and .1883 gm. H_2O = 7.23 p. c. Hydrogen.

II. .2190 gm. gave .4200 gm. CO_2 = 52.33 p. c. Carbon and .1412 gm. H_2O = 7.17 p. c. Hydrogen.

Nitrogen.—I. Dumas' Method—.5314 gm. gave 77.1 c. c. Nitrogen at 18° C., Barometer 763.5 m.m. at 22° C. = 16.78 p. c.

II. Kjeldahl Method—.4732 gm. gave ammonia = 9.73 c. c. HCl (1 c. c. = .00822 gm. Nitrogen) = 16.90 p. c.

III. .9973 gm. gave ammonia = 20.64 c. c. HCl = 17.01 p. c. Nitrogen.

Sulphur.—.8400 gm. gave .0547 gm. $BaSO_4$ = .007513 gm. Sulphur = .89 p. c.

2. Extraction with Salt-Solution after treatment with Alcohol.

PREPARATION 15.

Since digestion of oats first with water or with salt-solution altered the alcohol-soluble proteid, it was thought possible that by preliminary treatment with alcohol a salt-soluble body might be obtained different from the one extracted directly by salt-solution.

To test this hypothesis three pounds of fine-ground oats were extracted, in the cold, three times with 6 liters of alcohol of .9 sp. gr. After pressing out as thoroughly as possible, the residue was treated three times with 10 p. c. sodium chloride solution, the solvent each time being allowed to stand in contact with the oats for 24 hours. The first and second extracts were united, filtered and saturated with sodium chloride. The precipitate was filtered out and found to be but partly soluble in 10 p. c. brine. It was therefore dissolved in solution of sodium carbonate of ¼ p. c., and the filtered liquid was exactly neutralized with acetic acid which separated the proteid as a white precipitate. After washing thoroughly by decantation with distilled water, with dilute alcohol, with ether, and finally with absolute alcohol, the substance was dried over sulphuric acid. As it weighed only 2.1 grams, the greater part of the salt-soluble proteid in the oats had evidently been converted into an "albuminate."

OAT-GLOBULIN—*Extracted by* 10 *p. c. Salt-Solution after treatment with Alcohol. Dissolved in* ¼ *p. c. Sodium Carbonate Solution and precipitated by Acetic Acid.*

15.

		Ash-free.
Carbon	52.39	52.48
Hydrogen	6.93	6.94
Nitrogen	16.82	16.85
Sulphur	.57	.57
Oxygen	----	23.16
Ash	.17	----
		100.00

Ash.—.3773 gm. gave .0006 gm. ash = .17 p. c.

Carbon and Hydrogen.—.3187 gm. gave .6122 gm. CO_2 = 52.39 p. c. Carbon and .1993 gm. H_2O = 6.93 p. c. Hydrogen.

Nitrogen.—Dumas' method—.3220 gm. gave 47.17 c. c. Nitrogen at 18° C. Barometer 759.3 m. m. at 28° C. = 16.82 p. c.

Sulphur.—.7435 gm. gave .0304 $BaSO_4$ = .004216 gm. sulphur = .57 p. c.

VI. PROTEIDS EXTRACTED BY WEAK POTASH SOLUTION.

1. Extraction after treatment of the Ground Oats with Alcohol.

PREPARATION 16.

Another extraction was made in nearly the same manner as that employed by Kreusler in preparing his "Oat Legumin:" Five pounds of freshly-ground oats were treated in the cold with

alcohol of .9 sp. gr. as long as any proteid was removed. The residue was digested for some time with 7 liters of $\frac{2}{10}$ p. c. potash-solution. The whole was then thrown on a sieve and the turbid percolate allowed to stand for 24 hours.

The dark-colored solution was syphoned off, let stand another 24 hours, decanted from the slight sediment and then precipitated with very dilute acetic acid. After 24 hours the substance had so far settled that about two-thirds of the liquid could be decanted. To the remainder, alcohol was added until the solution had a sp. gr. of .93. On further standing, the precipitate deposited and was transferred to a filter. It was washed with stronger alcohol, removed from the paper and dissolved again in $\frac{2}{10}$ p. c. potash-solution. A turbid liquid resulted which could not be filtered until a little sodium chloride had been added, which precipitated some of the dissolved proteid. This precipitate was soluble both in additional potash-solution and in brine. More salt was therefore added, the nearly clear solution was then filtered, which process lasted for about a week. Decomposition was entirely prevented by the use of thymol. The filtrate obtained each day was precipitated with dilute acetic acid, the precipitate was washed on a filter with water, then with dilute and afterwards with strong alcohol and was finally transferred to a flask filled with absolute alcohol. When the filtration was completed and the united precipitates had been digested with absolute alcohol, they were treated with ether and again with absolute alcohol and lastly dried over sulphuric acid, yielding preparation **16.**

OAT-PROTEID—*Extracted by $\frac{2}{10}$ p. c. KOH Solution after treatment of the Ground Oats with Alcohol.*

16.

	I.	II.	III.	I. Ash-free.
Carbon	52.11	52.18	----	52.45
Hydrogen	6.87	6.74	----	6.92
Nitrogen	16.52	16.48	16.40	16.63
Oxygen	----	----	----	23.19
Sulphur	.81	----	----	.81
Ash	.66	----	----	----
				100.00

Ash.—.7373 gm. gave .0049 gm. ash =. 66 p. c.

Carbon and Hydrogen.—I. .3666 gm. gave .7005 gm. CO_2 = 52.11 p. c. Carbon and .2265 gm. H_2O = 6.87 p. c. Hydrogen.

II. .4523 gm. gave .8651 gm. of CO_2 = 52.18 p. c. Carbon and .2746 gm. H_2O = 6.74 p. c. Hydrogen.

Nitrogen.—I. Dumas' method—.3577 gm. gave 51.44 c. c. Nitrogen at 18° C. Barometer 758.7 mm. at 22° C. = 16.52 p. c.

II. Kjeldahl method—.5037 gm. gave ammonia = 10.1 c. c. HCl (1 c. c. HCl = .00822 gm. N) = 16.48 p. c. Nitrogen.

III. 1.0412 gm. gave ammonia = 20.77 c. c. HCl = 16.40 p. c. Nitrogen.

Sulphur.—.8670 gm. gave .0510 gm. $BaSO_4$ = .0070 Sulphur = .81 p. c.

For comparison the analyses of the last four preparations are here stated together.

	13.	**14.**	**15.**	**16.**
Carbon	52.32	52.37	52.48	52.45
Hydrogen	7.19	7.24	6.94	6.92
Nitrogen	16.95	16.81	16.85	16.63
Sulphur	.88	.89	.57	.81
Oxygen	22.66	22.69	23.12	23.19
	100.00	100.00	100.00	100.00

13 and **14.** Extracted directly by 10 p. c. NaCl solution.

15. Extracted by 10 p. c. NaCl solution after treating the ground oats with alcohol, then dissolved in $\frac{1}{4}$ p. c. Na_2CO_3 solution and precipitated by acetic acid.

16. Extracted by $\frac{2}{10}$ p. c. KOH solution after exhausting the ground oats completely with alcohol.

The four preparations agree in composition so closely that it is fair to assume that they were pure and that the analyses correctly represent the composition of one and the same proteid.

Of the above analyses, **13** and **14** represent the composition of oat-globulin as extracted by 10 p. c. solution of pure sodium chloride and still soluble in that menstruum, while **15** and **16** represent the insoluble or "albuminate" modification of the same proteid.

Analysis **15** indicates that the globulin is not essentially changed in composition by being dissolved in weak sodium carbonate solution and precipitated therefrom by dilute acid.*

Since all proteids, except the coagulated, are soluble in weak alkali, analysis **16**, made on a substance extracted by $\frac{2}{10}$ p. c. potash-solution, may be taken to exhibit the composition of whatever uncoagulated proteids remain in the oat after the direct extraction with weak alcohol. The close agreement of **16**

* The low figure for sulphur in **15** is accidental, some loss having been incurred in oxidizing the substance by fusion with alkali-nitrate and carbonate. The determination could not be repeated for lack of material.

with the other analyses leads to the conclusion that the oat-proteids which are not extracted by weak alcohol mainly consist of either the salt-soluble globulin or its "albuminate" modification or else of a proteid from which these are derived under the influence of the solvents employed in their preparation.

The amount of these preparations obtained in a form suitable for analysis was a very small fraction of the total proteid contained in the oats. This was probably due to the conversion of the globulin into an "albuminate" or a "coagulated proteid."

The exact cause of this change has not been ascertained. To test the hypotheses that it might be due to the action of an acid or acid-salt contained in the oats, 100 grams of the freshly ground grain were treated with 800 c. c. of $\frac{2}{10}$ p. c. potash-solution. The resulting mixture was neutral to litmus and did not redden phenolphthalein. Eighty grams of sodium chloride were then added and the solution, after standing some time, was filtered. Very little proteid was thus extracted. In another trial, 10 p. c. solution of sodium chloride mixed with $\frac{2}{10}$ p. c. of sodium carbonate, extracted but a small part of the proteids.

100 grams of oats treated with $\frac{2}{10}$ p. c. solution of sodium carbonate gave an extract containing much proteid, which on addition of a little sodium chloride yielded an abundant precipitate. Neutralizing the sodium carbonate extract, gave a precipitate which was insoluble in sodium chloride solution.

These experiments indicate that the insolubility of the greater part of the oat-proteids in 10 p. c. brine is not due to the presence of an acid or acid-salt.

Weyl has stated that when wheat flour is extracted with sodium chloride solution, the residue yields no gluten on kneading with water, and he considers that the gluten does not preëxist in the wheat but is a product of ferment action. It was thought that if a ferment occasioned alteration of oat-proteids, its effect might perhaps be prevented by treating the ground oats with a sodium chloride solution heated to 75° C. so that all the soluble proteids coagulable below that temperature would be rendered insoluble and inoperative as ferments. The globulin coagulating at 80° C. ought not to be affected by this treatment. Experiments made to prove this view did not result in the extraction of much if any more globulin than was obtained when a cold salt solution was employed.

The trials next to be described have an important bearing on the alterations of proteids which take place in the presence of water.

2. Direct Extraction of the Ground Oats with weak Potash-Solution. Preparation **17.**

100 grams of freshly ground oats were treated with 500 c. c. of $\frac{2}{10}$ p. c. potash-solution. The mixture, after standing some time, was found to be neutral to litmus paper. It was then strained through a coarse cloth to remove the husks and the residue was treated with 100 c. c. of $\frac{2}{10}$ p. c. potash solution and squeezed out nearly dry. The solutions and washings were united and 100 c. c. $\frac{2}{10}$ p. c. potash-solution added thereto, making 700 c. c. in all. The liquid was then faintly alkaline to litmus. On standing the insoluble matter settled out; the solution was decanted, filtered and the residue treated again with $\frac{2}{10}$ p. c. potash-solution. The first potash-extract was very dark brown in color, the second much lighter. A third extract contained very little proteid. The first and second extracts were united, filtered and precipitated with acetic acid added to acid reaction, washed thoroughly with water, alcohol and ether and dried over sulphuric acid. The preparation weighed 7.8 grams. A portion treated with $\frac{2}{10}$ p. c. potash-lye was completely soluble giving a perfectly clear solution. The rest of the preparation was treated with hot alcohol of .9 sp. gr. which took up a little proteid. It was washed with hot alcohol of .9 sp. gr. until nothing more was removed, then with absolute alcohol and finally with ether and was dried over sulphuric acid. After drying at 110° C. the substance was analyzed with the following results:

OAT-PROTEID.—*Directly extracted with $\frac{2}{10}$ per cent. KOH-Solution.*

17.

			Ash-free.	
	I.	II.	I.	II.
Carbon	52.96	----	53.49	----
Hydrogen	6.93	----	7.01	----
Nitrogen	16.23	16.10	16.39	16.26
Sulphur	.98	----	.99	----
Oxygen	----	----	22.12	----
Ash	1.00	----	----	----
			100.00	

Ash.—.7063 gm. dried at 110° gave .0071 gm. of Ash=1.00 p. c.

Carbon and Hydrogen.—.2651 gm. gave .5148 gm. CO_2=52.96 p. c. C, and .1654 gm. H_2O=6.93 p. c. H.

Nitrogen.—I. Kjeldahl Method—.7395 gm. gave ammonia=14.6 cc. HCl (1 cc.= .00822 gm. N)=16.23 p. c. N.

II. Dumas' Method—.4285 gm. gave 59.82 cc. Nitrogen at 15° C, Barometer 751.5 mm. at 21° C.=16.10 p. c. N.

Sulphur.—.5196 gm. gave .0373 gm. $BaSO_4$=.00512 gm. Sulphur=.98 p. c.

3. *Extraction of the Ground Oats with weak Potash-Solution after One Hour's treatment with Water.* Preparation **18.**

One hundred grams of ground oats were next treated with 800 c. c. of water, the mixture was passed through a cloth to remove husks and the residue washed with 200 c. c. of water. The liquid, with suspended starch, etc., was made up to the volume of a liter and after the oats had been for an hour in contact with the water an equal volume of $\frac{2}{10}$ p. c. potash-solution was added and intermixed.

After standing over night the strongly colored solution was decanted from the residue, filtered, precipitated with acetic acid, the precipitate washed with hot alcohol until nothing more could be removed and then with absolute alcohol and ether and dried over sulphuric acid. This preparation weighed 4.25 grams. The residue was treated a second time with $\frac{2}{10}$ p. c. solution of potash and *very little* more proteid was extracted. After drying at 110° C., this preparation was analyzed with the following results :

OAT-PROTEID—*Extracted by* $\frac{2}{10}$ *p. c. KOH-Solution after* 1 *Hour's Contact of the Ground Oats with Water.*

18.

			Ash-free.	
	I.	II.	I.	II.
Carbon	51.51	----	52.36	----
Hydrogen	7.16	----	7.27	----
Nitrogen	16.95	17.03	17.23	17.31
Sulphur	.69	----	.70	
Oxygen	----	----	22.44	
Ash	1.63	----	----	
			100.00	

Ash.—.2760 gm. dried at 110° C. gave .0045 gm. ash=1.63 p. c.

Carbon and Hydrogen.—.2953 gm. gave .5576 gm. CO_2=51.51 p. c. C, and .1904 gm. H_2O=7.16 p. c. H.

Nitrogen.—I. Kjeldahl Method—.5867 gm. gave ammonia=12.1 cc. HCl (1 cc.= .00822 gm. N)=16.95 p. c.

II. Dumas' Method—.5120 gm. gave 75.49 cc. N at 15° C., Barometer 753.6 mm. at 23° C.=17.03 p. c.

Sulphur.—.7210 gm. gave .0365 gm. $BaSO_4$=.005013 Sulphur=.69 p. c.

In this analysis the fusible ash made the combustion of the last traces of carbon difficult; hence probably ash and nitrogen are stated a little too high and the carbon is slightly inaccurate.

4. Extraction with Potash Solution after 24 Hours' contact of the Ground Oats with Water. Preparation **19.**

100 grams of oats were treated in the manner just described except that instead of the 1000 c.c. of potash solution first added, 1000 c.c. of distilled water were used. After standing 24 hours the aqueous solution which had become clear was decanted and 1000 c.c. of $\frac{2}{10}$ p. c. potash-solution were added to the residue and let stand upon it over night. The solution was then decanted from the residue, filtered, precipitated with acetic acid, the precipitate was washed with hot alcohol of .9 sp. gr. and with absolute alcohol and ether and dried over sulphuric acid. The preparation weighed 2.55 grams. The following figures were obtained in its analysis.

OAT-PROTEID—*Extracted by $\frac{2}{10}$ p. c. KOH-Solution after 24 Hours' Contact with Water.*

	19.	Ash-free.
Carbon	52.29	52.61
Hydrogen	6.88	6.92
Nitrogen	16.89	16.99
Sulphur	.89	.89
Oxygen	22.46	22.59
Ash	.59	----
	100.00	100.00

Ash.—.5578 gm. dried at 110° C. gave .0033 gm. ash =.59 p. c.

Carbon and Hydrogen.—.3300 gm. gave .6327 gm. CO_2=52.29 p. c. C, and .2042 gm. H_2O=6.88 p. c. H.

Nitrogen.—Kjeldahl Method—.5426 gm. gave ammonia=11.15 c.c. HCl. (1 c.c.= .00822 gm. N)=16.89 p. c.

Sulphur.—.8310 gm. gave .0543 gm. $BaSO_4$=.00746 gm. Sulphur =.89 p. c.

The three preparations last described were made by extraction with the same dilute potash-solution and under essentially the same conditions in all respects, with the single difference, that while in case of **17,** the oats were directly treated with this solvent, **18** was extracted by potash-solution after the ground oats had been kept in contact with water for 1 hour, and **19** after digestion with water for 24 hours.

The amount of proteid extracted in the first instance was 7.80 gm. **17.**
" " " " second " 4.25 gm. **18.**
" " " " third " 2.55 gm. **19.**

The composition of the three preparations is placed in comparison with that of the oat-globulin **13**, in the subjoined statement.

OAT-PROTEID.

	Extracted by—			
	NaCl solution.	Potash Solution		
	Direct.	Direct.	After contact with water for 1 hour.	24 hrs.
	13.	**17.**	**18.**	**19.**
Carbon	52.32	53.49	52.36	52.61
Hydrogen	7.19	7.01	7.27	6.92
Nitrogen	16.95	16.39	17.23	16.99
Sulphur	.88	.99	.70	.89
Oxygen	22.66	22.12	22.44	22.59
	100.00	100.00	100.00	100.00

The experiments just detailed tend to show that the action of water upon the crushed oat-kernel induces rapid changes of composition in these proteids simultaneously with their conversion into insoluble modifications.

They also indicate that the *globulin* itself is a result of changes brought about in the presence of water and is not a body existing as such, ready-formed, in the oats.

5. *Norton's Avenine and Kreusler's Oat-Legumin.*

The substance extracted directly by potash-solution without previous exposure of the oats to water **17**, is probably the same as that which Johnston and Norton originally termed *Avenine* and which the latter obtained by digesting ground oats in water to which a little ammonia was added to prevent souring, as the weather was very warm (Am. Jour. Sci., 2 Ser., v, p. 23). The preparation which Norton analyzed, as Avenine, was however extracted by water alone and was accordingly a mixture (loc. cit., p. 28). Both Norton and Kreusler applied weak alkali-solution to the extraction of proteid bodies from oats *after* the ground grain had been subjected to the action of water.

Norton made and analyzed two preparations, accomplishing the extraction by means of dilute ammonia, and threw down the proteid by adding acetic acid to the ammoniacal solution. One preparation **A**, was redissolved in strong ammonia at nearly the boiling point and again precipitated by acetic acid, then washed (presumably with water), and boiled in alcohol and ether until no more fatty matter was taken up. Another preparation B, was boiled in alcohol and ether *before* re-dissolving in very dilute ammonia at 70° to 80° C.

Norton made a single analysis of A and two fairly accordant analyses of B, the average of which is the basis for the corrected analysis given below. He found in both substances 1 p. c. of phosphorus which he includes in the analyses reckoned ash-free. This phosphorus in A nearly equals and in B exceeds the ash. If this phosphorus be deducted and the analyses recalculated to a per cent. statement we have the corrected analyses given below. As Norton published no analytical details and used a method of doubtful accuracy (Berthier's) for estimating phosphorus, this correction is perhaps not altogether satisfactory. Norton's nitrogen determinations were all made by Dumas' method. Norton gives to this substance no special name but designates it as a "protein body" simply.

Kreusler's preparation of *Oat-legumin* **A**, was obtained by suspending 1½ pounds crushed oats in 5 liters of water adding, to neutralize the acidity, over 3 grams of potassium hydroxide. The mixture stood 12 hours in a cool place, was then thrown on a sieve, the residue washed with water and the liquid left to rest over night. The turbid liquid was poured off and acidified with acetic acid. The precipitate was washed first with alcohol of 40 p. c. then with that of 80 p. c. then with ether, and lastly, was treated with absolute alcohol and dried over sulphuric acid and at 100°. To purify this substance from starch it was dissolved in dilute potash (1 gram to the liter of water) and from the solution after deposition of all suspended matter, it was thrown down again by acetic acid and washed and dried.

Another preparation B, was obtained from oats that had been extracted by cold alcohol—and a third C, from oats exhausted with hot alcohol—previous to treatment with weak potash-solution. The analyses of A and C, corrected by deduction of ash and phosphoric acid, are here tabulated. In his preparation B, Kreusler found 16.74 p. c. of nitrogen but carried the analysis no further.

PROTEID *obtained from Ground Oats after treatment with Water by extracting with weak solution of—*

	Ammonia. Norton.		*Potash.* Kreusler.	
	A	B	A	C
Carbon	53.72	52.35	52.09	51.58
Hydrogen	7.00	6.93	8.03	8.01
Nitrogen	16.94	16.55	16.83	17.61
Sulphur	.60	1.12	0.96	----
Oxygen	21.74	23.05	22.09	----
	100.00	100.00	100.00	

Norton remarks of his preparation **A** that dissolving it in hot strong ammonia would seem to have darkened the color and somewhat affected the composition. It will be observed that Norton's **B** does not differ greatly from my analyses **13** and **19**.

Kreusler doubting the purity of his preparations boiled them in alcohol of 60 p. c. and finding that something was thereby dissolved, especially from **A**, continued this treatment as long as anything was removed. The dissolved substance contained 16.38 p. c. of nitrogen. The thus "purified" preparations had the following composition, ash-free :

	A	C	Average.
Carbon	51.40	51.85	51.63
Hydrogen	7.49	7.49	7.49
Nitrogen	17.29	17.03	17.16
Sulphur	0.85	0.73	.79
Oxygen	22.97	22.90	22.93
	100.00	100.00	100.00

The average of the last two analyses Kreusler gives as expressing the composition of OAT-LEGUMIN.* He observes, in concluding his paper, that the substance purified by long boiling with alcohol had almost entirely lost solubility both in potash and acetic acid. It was in fact converted into coagulated proteid; but, that the change of composition was not entirely due to the removal of impurities and in part at least was owing to alteration of the substance itself, must be regarded as almost certain.

It is to be concluded that the "globulin" extracted by 10 p. c. salt-solution and the "legumin" removed by dilute potash solution after action of water upon the crushed grain, are very similar, perhaps identical in composition, and that neither of them pre-exists in the grain; but the investigation on these points is not altogether conclusive and needs to be continued.

Assuming that Kreusler's analyses are correct there can be little doubt that his Oat-legumin as finally analyzed was different from

*In a paper already referred to (Pflüger's Archiv., xviii, 236), Ritthausen decided that the soda-lime method used by Kreusler was untrustworthy and stated, as the result of his own analysis by Dumas' method, the nitrogen-content of *Oat-legumin* to be 17.45 p. c. It is now well understood that Dumas' method, carried out as Ritthausen describes, in the paper referred to, usually gives too high results due to retention of air in the oxide of copper, etc., and formation of carbon monoxide during the combustion. See report of this Station for 1878, p. 111 and for 1879, p. 124.

the proteid at first existing in the potash-extract, and was essentially altered in composition as well as in solubility, during the processes of preparation and "purification."

VII. Proteid extracted by Hot Sodium Chloride Solution. Preparation 20.

Freshly-ground oats were treated with distilled water heated to 65° C. and then sodium chloride was added sufficient to make a 10 per cent. solution. When the addition of salt was begun the liquid had a temperature of 60° C.; when finished, the temperature was 45°. The mixture was digested for about an hour at 45° and a portion of the extract was filtered. The filtrate became turbid immediately on cooling. When gently warmed the turbidity completely disappeared. The perfectly clear solution on further heating coagulated as follows: at 57° C. a very slight turbidity was seen that increased but little up to 78°, whence it rapidly augmented with formation of flocks at 85°.

The remainder of the extract together with the crushed oats was heated up to 75° and filtered as rapidly as possible. A perfectly clear filtrate was obtained which became turbid on cooling. The vessel containing the hot extract was placed in a large water-bath at 75° and cooled very slowly. A dense deposit formed which closely adhered to the bottom of the dish and under the microscope was seen to consist entirely of minute *spheroids* about $\frac{1}{100}$th of a millimeter in diameter.

The residual oats extracted twice again, yielded little more to the hot salt-solution. The proportion of proteid thus obtained was apparently little if any greater than that dissolved by sodium chloride solution at 15° to 20°.

The deposit of spheroids was almost wholly freed from the mother-liquor by simple decantation and was treated with cold 10 per cent. sodium chloride solution in which it dissolved very slowly. On warming to about 40° the substance melted to a soft plastic mass which became softer as the temperature rose, and could be drawn out into glistening threads. At 65° the substance became so fluid that the mass broke up and rapidly dissolved to a clear solution.

When a portion of this solution was heated to 78° a slight turbidity developed that increased very little up to 98° at which point a few flocks separated. These were filtered out and the filtrate gave on boiling a considerable coagulum. The filtrate from this coagulum yielded another precipitate on boiling again

and the same result followed these operations to the fourth time. The final filtrate gave with hydrochloric acid a copious precipitate.

This substance was now prepared in greater quantity in the following manner. Five pounds of ground oats were treated with twelve liters of 10 per cent. sodium chloride solution, strained through a hair sieve to remove the husks and then heated to 60° in a water-bath of 70° and maintained at that temperature for an hour. The extract was then filtered as rapidly as possible. The extract after decanting from a deposit which separated out on cooling, was saturated with pure ammonium sulphate and the precipitate thus formed was filtered off and added to the deposit formed on cooling. The substance thus obtained was then treated with three liters of 10 per cent. sodium chloride solution heated to 65° in a water-bath of 70° and filtered as rapidly as possible on a funnel surrounded by hot water. The clear filtrate, which became turbid at once on cooling, was received in a vessel set in a large water-bath heated to 70° and the whole was allowed to cool very slowly. When cold the liquid was decanted from the dense deposit that adhered to the bottom and sides of the beaker.

As the substance dissolved to an opalescent solution in distilled water, it was washed with 50 per cent. alcohol as long as any chlorine was discoverable in the washings with silver nitrate, then with absolute alcohol, and with ether and dried over sulphuric acid ; 8.5 grams of substance were thus obtained. The salt-solution from which the spheroids had deposited was next dialyzed and the proteid which separated out on the removal of the salts was filtered off, washed in succession with dilute alcohol, absolute alcohol, and ether, and dried over sulphuric acid. This preparation weighed 5.64 grams.

The residue of the oats was extracted a second time in the same manner and the solution was at once saturated with ammonium sulphate. The precipitate thus produced was washed directly with 50 per cent. alcohol, but since the substance dissolved on washing with dilute alcohol as long as much ammoniun sulphate remained, the final yield was only 2.6 grams.

The product obtained from the solution of the first ammonium sulphate precipitate in hot brine has the following properties. Under the microscope, before washing, it appears to be perfectly homogeneous and to consist entirely of spheroids about $\frac{1}{100}$th of a millimeter in diameter. After washing and drying it forms a

dense snow-white powder. In cold distilled water it dissolves to an opalescent solution which gives a heavy precipitate on the addition of a little sodium chloride ; a little more sodium chloride precipitates the aqueous solution almost completely and on addition of still more salt this precipitate is again dissolved.

Hot distilled water dissolves this proteid completely to a perfectly clear solution from which a considerable part of the substance deposits on cooling.

Dilute acetic acid alone gives no precipitate in the aqueous solution. Addition of a little salt together with the acid precipitates it. The precipitate thus produced is soluble in alcohol of .9 sp. gr.

When treated with hot dilute alcohol the substance melts and remains suspended in the solution in transparent droplets ; addition of either a little salt or a little acetic acid produces no change but both together give a clear solution. This solution in alcohol on cooling forms a very bulky transparent jelly. On evaporation, the substance separates as a skin on the surface which is readily soluble again in dilute alcohol of .9 sp. gr.

On analysis the composition of the dried spheroids was found to be as follows:

OAT-PROTEID—*Extracted by Sodium Chloride Solution at* 65° *C.*

20.

			Ash-free.	
	I,	II.	I.	II.
Carbon	52.13	52.16	52.20	52.24
Hydrogen	6.93	7.02	6.94	7.03
Nitrogen	17.72	17.87	17.75	17.90
Sulphur	.81	.73	.81	.73
Oxygen	----	----	22.30	22.10
			100.00	100.00

Ash—.4694 grams substance dried at 110° C. gave .0009 grams of ash = .19 per cent.

Carbon and Hydrogen—I. .3639 gram dried substance gave .6955 gram CO_2 = 52.13 per cent. C, and .2270 gram H_2O = 6.93 per cent. H.

II.—.4728 gram dried substance gave .9036 gram CO_2 = 52.16 per cent. C, and .2985 gram H_2O = 7.02 per cent. H.

Nitrogen—Kjeldahl Method I.—.7768 gram substance gave ammonia = 16.75 cc. HCl Sol. (1 cc. = .00822 gr. N) = 17.72 per cent. N.

Dumas' Method II.—.4080 gram dried substance gave 62.36 cc. N, at 15° C. Barometer 762^{mm} at 21° C. = 17.87 per cent.

Sulphur—I. .7841 gram dried substance gave .0463 gram $BaSO_4$=.0064 gram S.=.81 per cent.

II.—.8670 gram dried substance gave .0460 gram $BaSO_4$=.0063 gram S.=.73 per cent.

The fact that this substance separated from warm sodium chloride solutions so readily in the form of spheroids indicated that, under proper conditions, it might be obtained in recognizable crystals. After a very large number of attempts which resulted only in the production of spheroids, a portion of that substance which had deposited on dialyzing the mother liquor from Preparation **20**, was converted into a mixture of spheroids and crystals. The latter were about $\frac{1}{10}$ mm. in their greatest diameters and to all appearance had distinct rhombic faces, but they were not perfectly developed and have not since been observed, many efforts to reproduce them having completely failed.

These crystals were obtained by saturating with the globulin a 10 per cent. sodium chloride solution heated to about 60° C. and allowing it to cool slowly in a large bath of warm water.

After many trials with Preparation **20** a portion of it was completely converted into perfectly formed octahedral crystals which Prof. S. L. Penfield kindly examined and pronounced to be isometric. These crystals were obtained by dissolving some of Preparation **20** in cold distilled water and cautiously adding sodium chloride until a copious precipitate resulted. On immersing the test tube in warm water the precipitate dissolved to a perfectly clear solution. This solution was then allowed to cool slowly in a bath containing about four liters of water heated to 60° C. After 24 hours the deposit was examined under the microscope and found to consist entirely of crystals.

By saturating *distilled water* heated to 60° C. with Preparation **20** and allowing the solution, surrounded by a large volume of warm water to cool slowly, an abundant deposit of octahedral crystals was obtained which were, however, not quite so perfectly developed as those just described.

No analysis of these distinct crystals has as yet been made. Their further investigation will be undertaken directly.

VIII. Methods of Analysis.

Drying.—Preparations preceding **12** were dried in hydrogen at 110° C. to a constant weight. Those following were dried in air at 110° C. Carbon and hydrogen were determined by combustion in a platinum boat in open tube filled with copper oxide and containing in addition a layer of lead chromate and a roll of metallic copper. In the analyses preceding **12** the portions taken for each carbon determination were dried separately to a

constant weight at 110° C. in a stream of hydrogen and weighed in a closed tube. For those following the entire sample was dried to a constant weight in air. By the latter method of drying, slightly higher percentages of hydrogen were obtained when the substance analysed was in the form of a light hygroscopic powder, the dense preparations obtained from alkaline solutions not being so hygroscopic gave slightly lower percentages of hydrogen, the difference is attributable to moisture unavoidably absorbed by the dry, light powder during weighing and transferring to the combustion tube, the analyses being made in very damp summer weather.

The accuracy of the determinations was repeatedly controlled by analyses made on pure sugar.

Nitrogen.—Nitrogen determinations were made both by the Kjeldahl and Dumas methods, in the manner customary in the Station Laboratory.* Preceding **12** the determinations were made upon the substance dried over sulphuric acid, a correction being applied for the moisture contained in the sample as found by drying it at 110° C. Subsequent determinations were made on the fully dried sample.

Sulphur.—Sulphur was determined by fusion with sodium-hydroxide and potassium nitrate, dissolving the fused mass in water, neutralizing the alkali with a considerable excess of hydrochloric acid, evaporating to dryness to decompose nitrates and to remove excess of acid, dissolving the dry residue in six or seven hundred centimeters of water, allowing the solution to stand for 24 hours, filtering, heating to boiling, and precipitating with three cubic centimeters of a 10-per cent. solution of barium chloride.

In the analyses of **8**, evaporation to dryness was omitted, the barium sulphate being fused with sodium carbonate and reprecipitated. In all cases the ash of the preparations was carefully examined for sulphates, but none was found in any instance.

Blank experiments with the reagents proved them to be entirely free from sulphur.

Ash.—Ash was determined by combustion in a platinum crucible, no difficulty being experienced in burning any of the preparations except **18**.

* Annual report of this Station for 1879, p. 124, and American Chemical Journal, vol. 2, p. 27.

IX. Summary of Results.*

1. The proteid body removed from fresh-ground oats by direct extraction with weak alcohol, first observed by Norton and by him designated *glutin*, when dehydrated by absolute alcohol and dried over sulphuric acid is a light yellowish powder, insoluble in pure water as well as in absolute alcohol, soluble in mixtures of alcohol and water, soluble also in dilute acids and alkalies, and from these solutions thrown down by neutralization. Separated from its solution in alcohol of 60 per cent. by evaporating off the alcohol, it forms a yellowish, slimy mass. Its composition (as found for Preparation **8**, p. 12), is given in the table, p. 46, under **I.** This substance is remarkable for its considerable content of sulphur, which is exceeded by that of keratin alone among the proteids, and is otherwise equaled only by that recorded in some analyses of serum-albumin. See pp. 5–14.

2. When the substance described above is heated with dilute alcohol for some time it coagulates and becomes insoluble in that liquid, but without apparent change of composition. **II.**, p. 46, is the average of three accordant analyses of this coagulated form of the alcohol-soluble proteid made on Preparations **7**, **4 A** and **4 B**; pp. 7–12.

Kreusler obtained this material from the oat, but what Ritthausen and he named *oat-gliadin* was a product of its further alteration by the chemical treatment to which it was subjected, with a view to purification. See pp. 4, 13 and 19.

3. When oats are first treated with water or 10-per cent. solution of common salt, before extraction with dilute alcohol, the alcohol-soluble proteid undergoes alteration, and a body of different composition and properties results. In the table, **III.**, is the mean of closely-agreeing analyses of this substance made on Preparations **9**, **10**, **11**, and **12**; it is much more soluble in dilute alcohol than **I.**, and is not coagulated or transformed into an insoluble modification. When wet with absolute alcohol, the moisture attracted from the air shortly renders it gummy and tenaciously adhesive, unlike **I.**

* This Summary is a revision of a part of Bulletin 105, issued by the Connecticut Agricultural Experiment Station, December, 1890, which contained some minor errors that are here corrected.

Its composition, as regards carbon, hydrogen, and nitrogen, is very near to that found by Dumas and Cahours, and also by v. Bibra, for *gliadin* or *plant-gelatin* (extracted by hot alcohol from wheat-gluten and remaining dissolved in the alcohol when cold).

4. The chief proteid extracted by cold 10-per cent. salt solution behaves toward reagents like the *myosin-globulin* from animal muscle, as first stated by Weyl. Contrary to Weyl's observations, however, the coagulation temperature (80°—100°) is much higher than that of animal myosin (55°—60°). This proteid appears to be the result of a transformation similar to that by which myosin is formed from myosinogen. Its composition—the average of several analyses on Preparations **13** and **14**—is given under **IV**, and is very near to that of muscle myosin. The greatest proportion of this proteid extracted by salt-solution from the oat was 1.3 per cent. See pp. 23–28.

5. The proteid extracted, after complete exhaustion of the oats with alcohol of 0.9 sp. gr., by 10-per cent-salt-solution, (analysis of Preparation **15** under **V.**) and that dissolved out by dilute potash, (analysis of Preparation **16** under **V.***a.*), have so nearly the same composition as the globulin extracted by salt-solution directly, that they may be regarded as originally identical, **IV.** representing the soluble form, **V.** and **V.***a.* the insoluble or "albuminate" modification. See pp. 28–32.

6. When ground oats are directly extracted by weak potash-solution without previous treatment with water or dilute alcohol, nearly the whole of the proteids is dissolved. The substance so extracted, after completely removing the body soluble in weak alcohol, is perhaps the same as that first designated *Avenine* by Johnston and Norton, who extracted oats with dilute ammonia-water. Its composition, as indicated by analysis of a single Preparation, **17**, is stated under **VI.**, see also pp. 33 and 36.

7. When ground oats are exposed to the action of water, a large share of the proteids becomes insoluble in dilute potash-solution, the amount so rendered insoluble increasing with the duration of the contact with water. One hour's treatment with water rendered one-half, 24 hours' treatment made two-thirds insoluble in $\frac{2}{10}$ per cent. solution of potash. The composition of the part soluble in potash, after action of water (and removal of the alcohol-soluble proteid), as found in analyses of preparation **18** and **19**, the average of which is stated under **VII.**, is the same as that of the globulin soluble in salt solution, **IV.**

This proteid, obtained by extraction with potash, *after* the action of water, is probably the substance which Kreusler converted into his *Oat-Legumin* by the "purifying" process to which he subjected it. It is also the "protein body" which Norton extracted by weak ammonia and analyzed. See pp. 34–38.

8. When ground oats are extracted with 10 per cent. sodium chloride-solution heated to 65° C. a proteid separates on cooling, in the form of spheroids. This substance differs in composition, and properties from that obtained by cold salt-extraction as well as from all proteids hitherto described. It is soluble in pure water, precipitated from such solutions by a little sodium-chloride, is again dissolved by a certain additional quantity and is precipitated completely by saturation with this salt. In the presence of a little sodium-chloride and acetic acid it is soluble in alcohol of 0.9 sp. gr. From solutions in distilled water, as well as from those in sodium chloride brine, it has been obtained crystallized in regular octahedrons. Analysis (of spheroids) under **VIII.** See pp. 39–41.

9. The aqueous extract of ground oats was found, in agreement with Norton and Kreusler, to contain very little proteid substance. The proteids thus dissolved appear to be, first, an *Acid-albumin;* second, a *Globulin* or *Globulins* similar in reactions to that extracted by 10-per cent.-salt-solution, and third, a *Proteose.* No true albumin was found in the water extract. See pp. 20–23.

10. In the salt-extract a very small amount of a body was found, having the reactions of *Albumin,* but not analyzed. pp. 23–25.

X. Table of Composition of Proteids from the Oat-Kernel.

	I.	II.*	III.*	IV.	V.	V. *a.*	VI.	VII.*	VIII.
Carbon	53.06	53.10	53.70	52.34	52.48	52.45	53.49	52.49	52.22
Hydrogen	6.94	6.91	7.00	7.21	6.94	6.92	7.01	7.10	6.98
Nitrogen	16.38	16.49	15.71	16.88	16.85	16.63	16.39	17.11	17.85
Sulphur	2.26	23.50	1.76	.88	.57	.81	.99	.80	.77
Oxygen	21.38		21.83	22.69	23.16	23.19	22.12	22.50	22.18
		100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

The numbers over the analyses in the above table correspond with those of the paragraphs in the foregoing summary.

* Average of several analyses.

XI. Key to Table X.

	Extracted by			
I	Alcohol of .9 sp. gr.,	directly,	Soluble,	**8**, pp. 126–127.
II	" "	"	Coagulated,	**7**, etc. pp. 124–125.
III	" "	after water,	Soluble,	**9–12**, pp. 128–132.
IV	Cold 10 p. c. NaCl Sol.,	directly,	Soluble globulin,	**13**, **14**, pp. 137–142.
Va	" "	after alcohol,	Albuminate "	**15**, p. 143.
V	1–10 p. c. KOH sol.,	"	" "	**16**, p. 144.
VI	" "	directly,	Initial proteid?	**17**, p. 117.
VII	" "	after water,	Albuminate globulin,	**18**, **19**, pp. 148–150.
VIII	hot 10 p. c. NaCl Sol.,	directly,	Soluble spheroids,	**20**, pp. 153–156.

GRASS-GARDENING.

By J. B. Olcott

"Natural history should be based upon natural facts, and not upon the artificial products of cultivation." *De Candolle*—Origin of Cultivated Plants. London, 1884, p. 409).

The author quoted for the above text was writing of the confusion among names of the cotton plant (*Gossypium*), and advising us to seek with care varieties "which are wild" as a way out of our difficulties.

For the solution of grass-problems this course is even more necessary. De Candolle was right in warning us not to base conclusions upon the "products of cultivation," for Grass-Gardens, at their best, will be but indexes and title-pages of the world at large. Observations confined to them must be no better than reading which stops at the introductions and prefaces of books.

The Grass-Garden lately established at South Manchester had its origin in that at New Haven, as the latter had in the forage of Connecticut and elsewhere; both growing out of the general desire to know more of the grasses we already have and of those the world outside can furnish to our agriculture and gardening.

In laying out the South Manchester grass-garden the Station collection at New Haven was drawn upon for plants or small bits of sod, of the desired grasses, in April, May and at other times during 1890, and also—its soil being excellent for growing and ripening them—for seeds from the collection of pasture-sods made in 1887, and of other sward-producing varieties that had come into its possession by the good will of its friends, purchase, or the accident of being found growing without name and by mistake, from packets of trade-seed.

It may be repeated here, that in the spring of 1887, the writer, as agent of the Station gathered more than six hundred sods —cutting them with a mason's trowel, by the top of a quart strawberry basket—from two or three hundred landed estates

of all sizes, bearing interesting spots and patches of close sward, in Rhode Island and eastern, central or southern Connecticut. This collection was made chiefly with a view to throw light on the *Agrostis* tribe, so that we might know whether it is proper to sell two or more kinds of seed out of the same bag.

Incidentally, varieties of *Festuca* and other genera, that were making turf, or were curious, unknown and promising, were sampled in passing, and the names of the people owning the land entered upon, were attached to the labels of the specimens whenever possible. Hence the seeds saved at the Station from what are there called the "Old State-Sods," had a certain value, as their origin was in some degree *known*.

In the gardens at New Haven and Manchester, the same rule of choosing sods for propagation by their useful performances on the ground somewhere, and in as many places as possible, has been applied with even more determination this year, and with very satisfactory results. In this way we begin with something of history and pedigree. Like does produce like, in grass as assuredly as among cattle, horses and men. Many sods of less than a square-foot, selected about Manchester for their evident turf-making habits and power, cut into fifty or seventy-five pieces and planted in April and May, now each cover completely fifty or seventy-five feet of land. Similar prolific varieties of *Agrostis*, *Festuca* and *Poa* are scattered about the older parts of the old Northern States, as have been seen by the writer, in part within the present year.

Late in May, for instance, Dr. Thomas Meehan of Germantown, Pa., sent to the Manchester garden by mail, from his fifty-years'-old lawn a sod of *Festuca* so small and thin that the postage was but four cents. That grass and six inches depth of the soil it now covers, would over-load a pair of horses. More extraordinary results proceeded from sods sent from a hundred-years'-old meadow by Wm. H. Rhawm, of the Bank of the Republic, Philadelphia.

The soil of the Manchester garden is a brown loam, gravelly and dry at one end of the acre chosen, and liable to be too wet at the other end. It was in stiff turf, manured from the farm and plowed in November, 1889. The part first planted was the site of neglected raspberry-rows, quince-bushes and red-cherry trees; tough ground, full of roots; but as this condition yielded to thorough tillage the land became fairly pleasant for surface work by the time the seed-plats were begun in July. Something more

than half of this acre is now occupied by two hundred and fifty or more plats, four feet square, and by two broad rows of grasses, all in clean cultivation. The remainder lies fallow and ready for another year's transplanting and sowing.

Many of the plats are duplicates to insure against accidents. Some stocks are small because, though valuable, no more seeds or sods were to be had. Stocks of two varieties are larger because of the kindness of a neighbor, Knight D. Cheney, who had them growing and increasing for one or two years in his own garden. This gentleman brought from abroad in July eight samples of the "best" English lawn-grass-seeds, telling the dealer they would be tested here. The seeds looked nicely, yet all but one of the best varieties for sward, (and there was no *Agrostis* among them), were so badly mixed that it is a pity such seeds should be imported free of duty. In each case the foreign seeds were tested and compared by sowing them side by side with seeds of the same kind or, at least, of the same name, saved by Dr. Jenkins or an agent of the Station.

Many tests and experiments are in progress, such as proving the uniformity of growth which springs from the divided product of turf from a single seed; the sowing of such "pedigree" seeds as were to be had, and the transplanting of stocks of sod, believed to be worthy, at different times and especially, late in the season.

How much we generally know about any grass may be judged by the fact that very few are aware that the only variety of *Phleum* we use—and the grass we oftenest sow—is of an amphibious nature and in some places, fairly an aquatic. The past season was too wet for us to assert that we have given any so-called aquatic grasses very severe tests. But we have several under cultivation, and the indications are curious and instructive.

Two door-yards in New Haven (those of Prof. Brewer and Prof. Johnson), have been put under experiment to show that a single variety of grass, well chosen, will shortly cover the ground. It takes some years to make felted turf, but those door-yard trials may be considered successful as far as they have gone. The grasses—a creeping *Agrostis* and a tillering *Festuca*—planted in tufts, or bits of sod, set 12 inches apart, in the middle of April, were not chosen because they were known to be the best, but because they were the only promising ones we had a sufficient stock of for so large plantings at the time. The earth was well enriched and in August the *Agrostis* with fair exposure to sun

had completely hidden the ground, while the *Festuca* sets had grown from less than two to five or six inches in diameter though the yard, with northerly aspect, was much shaded.

It is too early in American grass-gardening to assert or deny many things. But as yet we find no evidence that any variety of grass is pining for alien company and none that a mixture of seeds promotes the growth of any kind. There are plenty of grasses which evidently love to creep in and get what their neighbors are living on. If all flesh is grass, it is a rule which works both ways, for there are graminaceous families that exhibit the selfish and fleshly proclivities of human and animal nature strong enough to attract the attention of moralists. And these appear in gardens not under strict government, now, as they did in "the beginning." Hence, grass-gardens are needed to teach us what to cherish and what to condemn, or keep in check.

But with regard to mixing grass-seeds, look at our chief practices. Indian Corn is our most valuable grass. Do we mix beans or pumpkins with it, or allow weeds to grow in it, to the benefit of the corn-crop? Do we sow any thing with wheat, rye, oats or barley, thinking to increase the yield of grain?

Take timothy—the principal perennial grass we sow—do we mix other things with it to increase the yield of *Phleum?* Does the grower of this hay for market like to see other grasses driving the main one out of his land? No—and all these questions will be answered in the negative. We may choose to mix seeds some times, but we also choose when we can that our seed shall be pure, and that we may know enough to mix it wisely.

It should be remarked, in passing, that our "experiments" with grass are not so experimental as they may appear to those who have paid little or no attention to this particular branch of natural history. We walk by the light or towards it. As the honey-hunter lines the bee-tree with loaded bees, having two points, he reasonably expects to find the third. We place small reliance on strange seeds, but having seen a variety of grass making strong turf against odds, we have a certain confidence in that grass, and proceed to study its behavior under cultivation. Our treatment of it may be mere meddling—a series of blunders—or it may be skillful; therein chiefly lies the experiment; it is partly a test of ourselves. Smooth turf is not a wild but a domestic thing, and with the expert grazier or gardener, a product of careful labor and art. If we think that tough sward

is not a matter of the first agricultural importance, let us consider how the rudest and greediest forms of culture prosper so long as there is plenty of sod to break up and destroy.

In the Manchester garden we used seeds from the "Old State-Sods" which were planted at New Haven so near together, that according to all we know of grass-pollen, the seed might have been mixed and impure. Yet, so far as we can see, by observing the young grasses for this one season of two or three months only, they appear true to their kind and the question may be asked, "Why not rely upon seeds that we may gather from any interesting plants, rather than upon roots for these beginnings of exact culture?"

In reply it may be said that growth from individual seeds of sweet corn from the same cob for instance—grown entirely away from any other variety of maize—is liable, within narrow limits, to vary, and does vary so that nice cultivators take advantage of this fact of variation in changing and improving sweet corn by selection from repeated plantings. Maize in our climate is strictly annual, and we must rely on seeds, but with hardy perennial grass it is better—much better and safer in our opinion—(in these early stages of legitimate grass-gardening), to get the roots of any variety we deem worthy of propagation when we wish to convey to another hand a variety of grass in its integrity. Having a stock of the mother-plants we should prefer not to distribute to other gardens, plants which grew last fall from seeds of the Old State-Sods. In default of older roots of a variety, we shall do our best with the produce of seeds that from their liability to vary need more tests and longer watching.

Seeds so small as grass-seeds will trouble a beginner to distinguish them and keep them free from weeds and especially from other grasses in the first weeks of their sprouting and growth. But roots are more tangible. They grow quicker and begin to teach us the difference in grasses as soon as we unpack them from paraffine paper and moss and read their labels.

The transportation of roots is more troublesome than that of seeds, but they may safely go long distances in cool weather, many kinds in a box. Two distinct sods, shipped us by Hon. Augustine Heard, U. S. Consul at Seoul, Corea, reached us alive, as we are going to press, and in hopeful condition for propagation, with due care.

There will certainly be several varieties of grass-gardening. A farmer and grazier, intent on something he can use and perhaps grow seed of for sale, will choose a few kinds of sods which seem most promising, cut them in pieces and plant them in rows in different places. Or at first he may prefer to plant a row of forty or fifty named sorts in bits of sods, in his garden, for the edification of himself, his family and his friends. This should be no more trouble the first season, than rows of strawberries of the same length.

A gardener, desirous of improving dooryards and lawns, will select varieties of grass with finer textures and curious colors, and if he sees, as many gardeners do, that we spend money freely for fanciful and beautiful things, he will prepare himself to plant or sow lawns in tasteful mosaics and arabesque patterns, as our grandmothers pieced bed-quilts and wove counterpanes.

Superintendents of city and village parks, wishing to learn what good sward can be composed of and to show their cultivated patrons how the grasses, that we all live by, appear separately, and to teach ruder people that there are wild things worth hunting, besides rabbits under farmer's stone walls, might do worse than to copy the plant at Manchester with modifications to fit local tastes. There is not the least necessity for testing or exhibiting grasses by growth in rectangular patterns. They can be made to fit any shape, like silk, or cotton goods.

State grass-gardens may and should lead in testing and introducing the best native and foreign varieties, unless enterprising seedsmen, heartily ashamed of our present ignoble predicament as regards seeds, should combine to go ahead of us all in radical demonstrations of what can be done with this oldest, most promising and best-neglected industry.

To see whether it is possible for an agent of the Station to plant a small grass-garden on the land of unofficial parties, and trust the care of the same to its owners, as we do plantings of corn, potatoes, etc., a test was made in the garden of the Misses Gilman of Norwich Town. Twenty-three small plats of divided sod were planted June 14th. These were given perfectly clean tillage, and but a single plant was lost. In September, more than that number of plats, of sod or seed, were planted or sown. That fresh interest in grass-growing, and a more exact knowledge of the varieties we do or may cultivate, must spring from a little center of that kind is as obvious as it is true. Similar institutions of learning ought to be established throughout the State.

In like manner, on a larger scale, with more trouble and expense, not borne by this Station, its agent was enabled to co-operate with the Station of another State and a collection of grasses was well begun at State College, Center County, Pennsylvania. It is believed by those who have thought much about it, that the evils of mixed grass-seeds and mixed grass-names can be abated in a reasonable time, by the cultivation of the best varieties in gardens, with the coöperation of Experiment Stations.

Our plan for multiplied observations of precisely the same grasses, by the distribution and exchange of sods, and their growth in widely separated public and private gardens, is the shortest way out of the fog which envelops us. Testing seeds, as now gathered from all manner of uncertain or unknown sources, only adds to the muddle of names and varieties. When books don't agree, and writers are uncertain, we have a right to go to the plants themselves, separate them, compare them, and save seed from the best. Isolated States cannot prosecute this great business to advantage alone, against contrary opinions pouring in upon them. There must be close and exact coöperation.

Other Stations have given their adhesion to the methods practised in Connecticut, and there are indications of popularity in the movement towards better turf-grasses. Farmers and gardeners, who are judges of old and new things, with a desire to prove all, and hold fast that which is good, will govern themselves accordingly.

The plats at Manchester were marked for sod-planting with a light ten-barred frame of three-inch slats, crossing each other, through which six-inch . . . . . wire-spikes were driven half-way, and cut off, ... so the projecting heads would imprint mellow . . . . . earth as here shown. Round pine rods ¾ inch . . . . . diameter might serve as well as the wire-spikes. . . . . As the frame is exactly four feet square outside, the plant-centers, twenty-five in number, are not quite 12 inches apart.

For the seed-sowing, was used a frame four feet square *inside* made of 1¼ inch pine-plank, six inches wide, halved together at the corners, and fastened with wire nails and screws. This was very convenient to stand upon while sowing the seed and covering it with fine earth. The edges of the young grass came up neat and square, as in a miniature field. The handsomest plats in the Man

chester garden can be repeated by the acre, without extraordinary expense, when we have sods or seeds enough.

These frames are as large as one person can handle, and may be recommended for the general purposes of large testing and propagating gardens.

The seed-frame has two inch-square notches at its middle, inside and opposite each other, to receive the two one-foot pegs of squared and pointed $\frac{7}{8}$ pine, which are driven in line, at alternate distances of two and four feet, to mark the exact places of plats. The sod-frame, when in use, can be ranged by its center slat on these pegs, fitting between the pairs of them, which also mark the two-feet alley-spaces, and are handy to knock clogged weeding tools upon in wet weather. A smooth bit of plank, weighing ten or twelve pounds, and 12×15 inches square with an upright handle, to firm the soil; together with a sixteen-foot pole, with notches, to gauge distances between the aforesaid pegs, in driving them by the line; complete the list of special tools for plat-seeding or planting.

The tillage and weeding at Manchester was a rather serious affair, at first, and it would not be advisable for any one to undertake such ground as that was, unless fully aware of the difficulty of governing it. But the thrift of the grasses, both planted and sown, on that tough sod-land, was very gratifying.

Four hundred pounds of a good commercial fertilizer were used on the part of the land now in grass, because, presumably, the upturned soil, in the clutch of roots, would not be very fertile at first, and that the farm manure beneath the sod would be inoperative at the surface early in the season. The cause of certain faded spots in the grass and of its short growth in those places is not known at this writing. That matter has long called for investigation.

Serviceable plats for the comparative culture of grasses can be planted and sown of any size we please. The smaller they are the less our experiments will cost, especially if we have weedy land. A good plan for beginning a grass-garden is to prepare sod-land the season before we need it, as the fathers prepared ground for flax and other crops.

For the weeds at Manchester special tools had to be contrived and made, or the garden would have been an ignominious failure, only fit for the plow. This feature of the undertaking had been thought of for years, however, and these tools were illustrated in

the May, October and November numbers of the *American Garden* for 1890. Some of them are being manufactured to order by Smith Harper, Fox-Chase, near Philadelphia.

Because of the general inattention to varieties, hitherto, in this country, no varietal names are known for many sorts of *Agrostis*, *Festuca* and *Poa*. By their record and history several of these grasses, evidently prolific and fixed in type, must be very valuable. How can this value be realized? By propagating each, after its kind, from roots, slips or cuttings, and seeds—operations quite as easy when once well learned, as the increase of corn and potatoes. There is material at Manchester to start a hundred similar grass-gardens.

Another element of value consists in the fact that these garden grasses have become as nearly *pure* as possible in the time spent upon them. Except one variety (*Poa annua*), nothing has been allowed to go to seed, in the Manchester experiments. When many sorts of seed are allowed to scatter, the difficulties of grass-gardening are enormously increased, and the purity of the collection will be lost or placed in jeopardy. No instance of crossing between varieties, has been observed by recent Connecticut experimenters; but the nature of the subject demands extreme caution, since the chances are practically unknown.

Success at New Haven and Manchester, in the selection of varieties distinctly useful, must lead observers and reasoners to inquire: If these valuables can be picked up in a country where the conditions that produce domestic sward are comparatively new, what shall we find, under sward-making conditions, where cultivation is thousands of years older?

No farmer or grazier can examine these grass-gardens, even as late as Nov. 16th, the date of this writing, without being disturbed in his mind as to whether he has yet enjoyed the use and profit of the best grasses. So far as the useful grasses of the world are involved, our collections should be made complete as soon as possible, lest more labor and time be lost in propagating inferior varieties.

The beginner, in collecting valuable varieties of grass from the short sward of door-yards, pastures and meadows will need more instruction than can be given here; and attentive observation, while walking at leisure, will help vastly in illustrating the few words that may be ventured in a matter which requires, most of all, an experienced eye. The rather common impression

that all spots in turf come from unequal fertility, is mistaken. The droppings of animals do make many distinct spots, in pastures and meadows, no doubt, greatly changing the color and fiber of grasses. The learner must have practice enough to distinguish these appearances, and may find it easier to read the sward where no animals have been—as in door-yards, parks and lawns. There the gray or blue-green and sharply pointed leaves of some form of *Agrostis*, may be the first to attract attention. Or the shining spears of a *Poa*, a *Festuca* or a *Lolium*, may quickest take the eye. The identification of any one prevalent grass, wherever it occurs—like deciphering the prevailing letter in secret writing for a clue—will help greatly in distinguishing the rest. As we learn to know people at sight, without formal introduction, so we may recognize perfectly a number of grasses, when we have met them times enough, without knowing their names. Prof. McAlpine's work "How to Know Grasses by the Leaves" (David Douglas, Edinburgh, 92 pages, illustrated, price, 3 shillings 6 pence), will greatly assist those who know how to use good books to begin with. But to select turf that is worthy of propagation, requires keen sense of color and form, and will utilize all the practice possible to the farmer, gardener, and grazier. The acutest assistant at Manchester—Mr. Eli Risley—is a specialist in neither of these directions, however; but a veteran cassimere maker. His long experience with all manner of woolen fabrics, combined with his trained eye for colors, made him a practical connoisseur in turf fabrication almost at once. We have thousands of ingenious and cultivated people, who may become equally skillful, when their attention is turned to the matter, greatly to the advantage of Agriculture and Gardening.

As the skilled physician diagnoses disease or health, in part, by the skin of his patients, so the expert grazier or farmer always judges the condition of land by the appearance of its turfy integument; and often recognizes, by spots of this, that, or the other grass in the sward, the waning or increasing fertility of fields. And whether one becomes expert in knowing grasses by their leaves, roots, color, taste, feel, habits and habitats or not, the least training of the eye and judgment in these directions cannot fail of being useful to those who would govern the land. The best season for collecting sward-grasses is early in spring or late in fall or during open winters, while annual vegetation is dead.

What are called the "Pasture Plats" at the New Haven Station were laid down with the idea of having many known kinds of grass that could be cared for and observed through a number of years for grazing at will. The pasture-plats were planted a year ago last October. Sixty-four plats, with three or four exceptions, all of grasses and clovers, were set in the common sward of the Station (much improved of late years by broad-cast manuring and the grazing of cows well-fed in the stable) where they are distributed over a space sixty feet square. The ground of the plats was thoroughly dug fifteen inches deep, and fertilized as it should have been for planting a shrub or a small tree. In most instances, the roots or turf of the desired plants were set in place, flush with the general surface, and as closely as the stock in hand would allow. This method was chosen to make plats that would endure, as soon as possible, the treading of the two cows at the Station. The greater part of these plats were filled from the Station Forage Garden. The stock for five of them was sent in one barrel from South Windsor, East Hartford and Manchester. The material for as many more plats, perhaps, was picked up in the vicinity of New Haven. Weedy and mixed sods require persistent care to purify them. *Juncus Gerardi* (black grass), and *Spartina cynosuroides* (cord grass), were taken from the salt marshes. There is a plat of *Achillea millefolium* (yarrow), said to be a valuable forage-plant by English writers, whose seedsmen put *Plantago lanceolata* (narrow-leafed plantain), in their catalogues. The last-named weed was already in the four-feet wide alleys of the old pasture that surrounded each plat. There are many kinds of vegetation that domestic animals will eat at one time or another, but the burning questions are: How many of these need we take the pains to cultivate? How many ought to be allowed in trade seed-mixtures? The presence of a plant in the neglected pastures, is not sufficient proof that it is good husbandry to sow it anywhere. The absence of a plant from long-used pasturage may be evidence that we have allowed domestic animals to love it, not wisely but too well.

One of those pasture-plats was set with the roots of *Equisetum arvense* (horse tail), and it is thriving. This very persistent rush is said to injure horned cattle and *not* horses, in Germany, while in New England we hear that it kills horses, but other animals may eat it with impunity. Thousands of acres of the best natural meadow in Connecticut produce more or less of this plant,

which tastes very like some excellent grasses. Hundreds of tons of it are fed to our animals. Hence, as we know very little accurately about it, while many people fear it, and no one probably cares to see it in his land, *Equisetum arvense* becomes a legitimate subject for inquiry.

Other plats bring other forage-plants into strong contrast. *Carex vulgaris* (cut-grass), grows very near *Poa arachnifera* (Texas blue grass). The *Agropyrum repens* (quack grass) is not far from *Agropyrum glaucum*, which the cattle and horses of western ranges are said to be very fond of.

Eight frames made of six-inch chestnut fence-boards, covered with wire-netting, like quail-traps, were provided to protect any of these plats from too much grazing while they are in a state of probation; or while any of them are being renewed or changed by sowing or planting with other kinds of forage, which it is desirable to test by grazing, etc., or to put under surveillance.

Early last May, when some twenty-five or thirty of these plats had made a luxuriant growth of three to eight or twelve inches, according to their various natural statures; and while the white clover and "blue-grass" of the alleys was half-leg deep, the cows, that had been a week or two in pasture similar to that of the alleys, were turned in for three days in succession.

Several sets of notes were made at the Station upon this occasion, more for the sake of fixing our minds upon it than for publication. The patent fact was that those two cows reached entirely over the lush feed, they were used to, in the alleys, and licked out the strange plats which were in season, clean to the blanched stubble and roots, like the bottoms of so many meal-tubs. Evidently milch cows appreciate a variety of food quite as well as we do.

A veteran observer remarked that, "When dairymen and farmers get their eyes open to 'grass' they will be growing it pure, in five and ten-acre lots for the sake of variety." This would be reasonable for fodder as well as for seed. To make milk, and beef plenty and good, cattle must EAT, and it is evident that the proper variety of fodder will tempt them to eat and keep them in health while they are consuming and producing their utmost.

After the three days of grazing the pasture-plats had a long rest, and some nursing. It is not good farming to graze pastures closely that are less than a year old. Twice afterwards, at intervals the cows were let in; once when all the plats were as tough

and dry as they could well get during a wet August, and only the lawn-mowed alleys were succulent; but Daisy and Nancy proved themselves excellent judges of fodder. They used the tall wiry grass of some plats like pasture bushes to knock the flies off, and showed their preference for fresh vegetation every time.

Whether public opinion should require every agricultural experiment station, school, or society to devote so much as sixty square feet of land to grass-tests of a like character, may be a question. That such a requisition would tend to purge our literature of grass-mistakes, and our farms of weeds, by bringing sheep and cattle back, with the common consent of the butcher, the wool-manufacturer, village dog and politician, there is no doubt whatever.

A certain proportion both of sward and of forest is needed for public safety. The American States have immense areas of ruined woods and wasted sod to make good. A careful and systematic study of the best methods for their renovation is most appropriate work for our Experiment Stations.

FEEDING STUFFS.

Here follow such analyses of Feeding Stuffs as are not discussed elsewhere in connection with field experiments. For explanations regarding the nature and uses of the separate food ingredients, the compounding of rations, "feeding standards," etc., reference may be had to earlier Reports of this Station, in particular the one for the year 1886.

Cotton Seed Meal.

2980. "Sea Island Meal." An undecorticated meal having a reddish-brown color. Sampled and sent by Messrs. Meech and Stoddard, from stock purchased of Butler, Breed & Co., of Boston. The fertilizing ingredients of this sample have been already given on page 25.

3073. "Sea Island Meal." Sampled and sent by F. M. Bartholomew, East Wallingford, from stock bought in New Haven, at $25.00 per ton.

3105. "Cotton Seed Bran." Sampled and sent by Horace Burr, Winchester. This sample in appearance and composition is not very different from the two samples of Sea Island Meal just mentioned.

3006. Purchased of R. H. Ensign, Simsbury, for $27.00 per ton.

3009. Purchased of J. and H. Woodford, Avon, for $27.00 per ton. The last two samples were drawn and sent by S. S. Stockwell, Sec'y Advance Grange, No. 22.

3106. From stock purchased and sampled by Horace Burr, Winchester.

Analyses—*As received.*

	2980	3073	3105	3006	3009	3106
Water	11.12	8.60	10.03	10.46	8.29	8.09
Ash	4.69	4.87	4.92	7.07	7.85	7.20
Albuminoids *	22.93	25.50	24.13	40.88	42.31	40.13
Fiber	17.48	17.65	21.39	7.53	3.78	8.53
Nitrogen-free extract	36.11	35.12	34.06	25.18	24.13	27.69
Fat	7.67	8.26	5.47	8.88	13.64	8.36
	100.00	100.00	100.00	100.00	100.00	100.00

* Total Nitrogen × 6.25.

Water-free.

	2980	3073	3105	3006	3009	3106
Ash	5.3	5.3	5.4	7.9	8.5	7.9
Albuminoids	25.8	27.7	26.8	45.7	46.1	43.7
Fiber	19.7	19.2	23.7	8.4	4.1	9.3
Nitrogen-free extract	40.7	38.8	38.0	28.0	26.3	30.0
Fat	8.5	9.0	6.1	19.0	14.9	9.1
	100.0	100.0	100.0	100.0	100.0	100.0

The last three samples are decorticated meal of usual quality. Nos. 2980, 3073 and 3105 are strikingly different in appearance, quality and feeding value. The low per cent. of albuminoids and the lower manurial value are due to the presence of hulls which are greatly inferior to the kernels in respect of the ingredients named. Undecorticated meal is fed at the South with good results, but the undecorticated meal at $25.00 is not nearly so economical as the decorticated meal at $27.00 per ton.

A statement of the fertilizing ingredients in two of the above samples and a valuation per ton *as fertilizers* follow. In the valuation nitrogen is reckoned at 15 cents, phosphoric acid at 7 cents, and potash at 6 cents per pound.

	2980	3006
Nitrogen	3.67	6.54
Phosphoric Acid	1.60	3.03
Potash	1.45	1.79
Valuation per ton	$14.99	$27.56

Linseed or Oil-Cake Meal.

2981. Steam-cooked Cleveland Oil-cake Meal.
2982. " " " Fine Linseed Meal.
3003. " " " Coarse Linseed Meal.

Sampled and sent by the Cleveland Linseed Oil Co., Cleveland, Ohio.

2662. Cleveland Linseed Meal, sent by J. W. Yale, Meriden.

2663. Old process Linseed Meal, bought of Mann Bros. & Co., Buffalo, N. Y., by J. W. Yale, Meriden.

3063. Old Process Linseed Meal, sampled and sent by Chas. M. Cox & Co., 10 Broad St., Boston, Mass.

ANALYSES.

	2981	2982	3003	2662	2663	3063
Water	12.52	12.79	12.45	9.60	12.76	9.48
Ash	6.05	5.44	5.96	5.53	5.59	5.40
Albuminoids (N. × 6.25)	31.81	35.69	37.81	37.11	32.75	37.56
Fiber	7.63	7.62	7.71	8.04	6.83	7.75
Nitrogen-free extract	35.34	35.33	33.94	37.09	33.01	32.95
Fat	6.65	3.13	2.13	2.63	9.06	6.86
	100.00	100.00	100.00	100.00	100.00	100.00

Water-free.

Ash	6.9	6.2	6.8	6.0	6.4	6.0
Albuminoids	36.3	40.9	43.2	41.1	37.5	41.5
Fiber	8.7	8.7	8.8	9.1	7.8	8.5
Nitrogen-free extract	40.5	40.6	38.8	40.9	37.9	36.5
Fat	7.6	3.6	2.4	2.9	10.4	7.5
	100.0	100.0	100.0	100.0	100.0	100.0

The manurial ingredients were determined in several of these samples, as follows:—

	2981	2982	3003
Nitrogen	5.09	5.71	6.05
Phosphoric acid	1.59	1.79	2.12
Potash	1.30	1.37	1.47
"Valuation"*	$19.06	$21.28	$22.88

* Nitrogen 15 cents, phosphoric acid 7 cents, and potash 6 cents per pound.

Next to Cotton Seed Meal, Linseed Meal carries a larger quantity of fertilizing ingredients per ton than any other commonly used feed. Like cotton seed it is sometimes used as a fertilizer.

MISCELLANEOUS FEEDS.

3007. Malt Sprouts. Stock of J. & H. Woodford, Avon. Sampled and sent by S. T. Stockwell, Sec'y, Advance Grange, West Simsbury.

3056. Brewers' Grains from Quinnipiac beer brewery.

3057. Brewers' Grains from ale brewery.

3068. Brewers' Grains from Weibel's beer brewery. Sampled by Station Agent.

3053. Middlings. Sent by H. P. Morse, So. Canaan. Suspected of adulteration.

3008. Corn and Oat Feed. Bought of J. & H. Woodford, Avon. Sampled and sent by S. T. Stockwell as above.

3101. Buffalo Sugar Feed. Bought by J. H. Webb, Hamden. Sampled by Station Agent.

ANALYSES.

	3007	3056	3057	3068	3053	3008	3101
Water	12.25	76.02	78.36	76.81	12.63	11.23	11.40
Ash	5.97	.90	.86	1.25	4.97	4.64	1.05
Albuminoids	26.13	5.78	4.20	5.75	16.62	7.00	22.06
Fiber	10.37	3.46	3.83	3.36	7.57	11.53	5.13
Nitrogen-free extract	44.20	12.37	11.33	11.57	54.54	62.68	51.13
Fat	1.08	1.47	1.42	1.26	3.67	2.92	9.23
	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Cost per ton	$18.00	$3.33	$3.33	$3.33		$24.00	$25.00
Water-free.							
Ash	6.8	3.8	4.0	5.4	5.7	5.2	1.2
Albuminoids	29.8	24.1	19.5	24.8	19.0	7.9	24.9
Fiber	11.8	14.4	17.7	14.4	8.7	13.0	5.8
Nitrogen-free extract	50.3	51.6	52.2	49.9	62.4	70.6	57.7
Fat	1.3	6.1	6.6	5.5	4.2	3.3	10.4
	100.0	100.0	100.0	100.0	100.0	100.0	100.0

The "Corn and Oat Feed" sample No. 3008, is a much less concentrated feed than either sound corn or sound oats, or any mixture of the two could be if the whole grain was used. This will be clear if we compare the composition of the three.

	Maize kernel. 211 analyses.	Oats. 27 analyses.	"Corn and oat feed."	Hay from mixed meadow grasses.
Water	10.9	11.0	11.23	14.5
Ash	1.5	3.1	4.64	5.1
Albuminoids	10.5	11.5	7.00	7.3
Fiber	2.0	9.8	11.53	29.1
Nitrogen-free extract	69.7	59.8	62.68	41.7
Fat	5.4	4.8	2.92	2.3
	100.0	100.0	100.00	100.0

The "Feed" contains much less albuminoids and fat than either oats or maize, and much more fiber and ash. It is probably a mixture of maize and inferior oats and chaff, or of clippings from oats. It has less albuminoids than good hay even though probably a larger percentage of digestible albuminoids.

There is no security in the purchase of mixed feeds. They are a sort of "dumping ground" for light seed, screenings and all kinds of mill-refuse.

No. **3053,** Wheat Middlings, bears no evidence of adulteration and is of fair quality as far as can be learned from the analysis.

Maize Kernels, Field-cured and Ensilaged.

Mr. D. H. Van Hoosear sent to the Station two ears of maize. One taken from the silo Dec. 22, the other field-cured, with the inquiry whether there had been a loss of any ingredients in the silo. Not knowing the original weight of the maize, the only point that could be ascertained was whether the samples differed widely in the composition of their dry matter.

The analyses follow :

Analyses.

	As received.		Water-free.	
	From silo.	Field-cured.	From silo.	Field-cured.
Water	40 47	13.92	----	----
Ash	.74	1.26	1.25	1.47
Albuminoids	6.90	10.03	11.59	11.64
Fiber	1.56	1.53	2.63	1.78
Nitrogen-free extract	47.38	69.08	79.57	80.24
Fat	2.95	4.18	4.96	4.87
	100.00	100.00	100.00	100.00

It is seen that the composition of the dry matter of these two samples is practically identical, and the analyses go to show that there has been no material change in the composition of the kernels in the silo.

This accords with the results of elaborate investigations made elsewhere on the same subject. The well-managed silo excludes air from the forage and impregnates it with powerful and harmless antiseptics, carbonic and other acids. These acids are products of fermentative change and are mainly formed out of the sugar in the broken and juicy parts of the ensilaged crop. The seeds of unhusked maize would naturally be little involved in this temporary fermentation, which is soon arrested by the acids developed in its progress, and occasions no more loss of nutritive substance than accompanies curing in the field.

Salt Herrings as Cattle Food.

Early in 1891, Mr. Maltby Gelston of East Haddam, sent to this Station a sample of alewives or herring with the following interesting account of his experience with them as a food for stock.

"I have fed the fish for the past three years. Three years ago last July I had a part of a barrel of alewives left over; not having enough to fill it I could not ship it to New York with my spring catch. Remembering that years ago when shad were plenty, if our cows went wrong at calving, we used to give as a remedy, the tails of these fish with good results, it occurred to me that alewives would answer the same purpose. This thought led to others. I remember that the largest sheep I ever saw, and one whose usual clip was about 16 pounds, was a cosset that fed near our fish place, and frequently used to steal our fresh shad as they lay on the banks of the river and eat them. This was sixty years ago, when I was a boy. I concluded to try salt alewives on my cows, and accordingly gave each of them a fish. Some of them would at first only lick them, while others would eat them at once. By degrees all of them began to like them exceedingly, since then I have fed them regularly during the winter, from three to six salt alewives each, once or twice a week. When I give them the fish I withhold their ration of grain. I give them the fish in the morning, that they may have free access to water should they want it. We have noted no effect either in the flow or flavor of the milk, but find the cows greatly improved in condition.

For poultry, we soak the fish till quite fresh, boil them and mix with meal or boiled potatoes, say about equal weight of each. We have now forty-one hens and five geese to which we give, every other morning, seven fish thus boiled and mixed. The poultry eat every bone and scale. The result is good.

These fish are caught in the spring in all rivers emptying into the ocean between Cape Hatteras and Nova Scotia. They can be bought at the fish place, same as samples, in bulk, at from $30.00 to $35.00 per ton.

Hayti and St. Domingo have been our market for them since the war of the Rebellion, for which market they usually bring about $4.00 per barrel of 200 lbs., delivered in New York. Previous to our late war the Slave States bought them at about the same price. The additional expense of fitting them for and

placing them on the market as food for man, together with commissions for selling, would make $30.00 per ton at the fish place as remunerative to the fishermen as the price obtained in the foreign markets. Query: Are they worth $30.00 per ton for feed for stock, with cereals or hay at the present prices"?

The fish as received were quite wet and very tender, easily breaking to pieces. A dozen of them weighed four pounds and fifteen ounces. Their composition was as follows:

	Undried.	Water-free.
Water	52.94	----
Salt	15.33	30.58
Other mineral matter*	3.58	9.59
Albuminoids †	18.10	38.46
Nitrogen-free extract	.85	1.81
Fat	9.20	19.56
	100.00	100.00
* Containing phosphoric acid	1.84	3.89
† Containing nitrogen	2.90	6.15

These salt fish contain more albuminoids, usually the most costly ingredient of feeds, than hay or any of the cereal grains. They contain one or two per cent. more of albuminoids than wheat bran, and two and a half times as much fat, but practically no other non-nitrogenous matter.

Fish suitably prepared is a valuable cattle food, and is regularly used for that purpose in some places, and for milch cows as well as other cattle.

The quantity of salt present in this sample would limit the feeding of it. Half a dozen alewives like those analyzed contain six ounces of salt, which is too much for an every-day ration. That number of herring would supply as much digestible albuminoids and two or three times as much digestible fat as three pounds of wheat bran. There is no reason why, fed after Mr. Gelston's method, they should not be a valuable addition to the winter feed of live stock.

Finely ground fish scrap as well as dried blood in the shape in which they are now offered in our markets are worth cautious and intelligent trial as food for stock. Their use would be to supply a concentrated nitrogenous product comparatively poor in non-nitrogenous matter to balance rations which in the great majority of cases are deficient in albuminoids.

On the Market Prices of the Ingredients of Feeding Stuffs.

The present market quotations of concentrated feeds and mill-products show a peculiar condition of things regarding the actual cost of albuminoids, fat, and carbhydrates (including fiber).

Cotton seed meal, which is the most concentrated feed in market, richest in both albuminoids and fat, has remained for the last few years quite constant in price. Linseed meal, which is also rich in albuminoids, has fallen decidedly within two years. The average price in January, 1888, was $32.25 for old process meal, and at the same date in 1890, $28.00. But on the other hand the corn and wheat feeds and by-products, which are relatively poor in albuminoids but rich in carbhydrates, some of them also in fat, have risen greatly in price, from 20 to 25 per cent.

It thus happens that in our ordinary mill feeds carbhydrates cost as much as albuminoids, as is seen in the following comparative statement of the average cost of food ingredients in fine mill feeds for the years 1888 and 1890:

	In 1888.	In 1890.
Albuminoids (N. × 6.25)	1.6 cents per pound.	1.4 cents per pound.
Fat	4.2 " "	2.9 " "
Carbhydrates (including fiber)	.96 " "	1.4 " "

Now while the carbhydrates take nothing from the land at harvest and add nothing as a fertilizer in the manure, every sixteen pounds of albuminoids harvested from the land carry with them a pound of nitrogen. And so too every sixteen pounds of albuminoids fed to cattle add a pound of nitrogen to the manure—less the amount withdrawn in the flesh or milk, which latter may be estimated at somewhere near half a pound of nitrogen to 40 quarts of milk.

It is true at any time that a generous and comparatively concentrated feed is the most economical; but, in view of the facts just cited, it is urged that feeders should give special care to their feeding, in order to have no waste of carbhydrates and to feed an excess of albuminoids, which enrich the manure, rather than an excess of carbhydrates, which have no manurial value.

Cotton seed and linseed meal, gluten meal, malt-sprouts, and brewers' grains seem at present to be the most economical of our concentrated feeds.

THE COMPARATIVE EFFECTS OF PLANTING IN HILLS AND DRILLS ON THE QUANTITY AND QUALITY OF THE MAIZE CROP.

Aside from the alleged advantage of cross-cultivation which is made possible by planting in hills the claim is frequently made that on an acre of land a given number of stalks standing in hills will, other things being equal, yield more than the same number of stalks planted in drills. The reasons given are in general that stalks in hills mutually support each other, that the ground is not so completely shaded by the crop and in consequence is warmer and air also circulates more freely when the planting is in hills.

When the stalks stand at a uniform and reasonable distance in the drill there would seem to be opportunity for all necessary circulation of air, and the more evenly plants are arranged in a field the more even will be the distribution of light among them, provided they stand close enough to secure the maximum yield and so to shade each other very considerably. What is gained by one plant in a hill in the way of exposure to light must be lost to another. That certain spots on the soil might be warmer when maize is planted in hills may be granted, but that the mass of the surface soil is made warmer by this means seems doubtful, as does the advantage of one method of planting over the other in the way of mutual protection by the stalks in heavy storms.

The following experiment was undertaken as a contribution to the discussion of the question.

The land used was the same as that described on pages 10 and 219 of the Report of this Station for 1889, where the history of the land is given and all details as to previous crops, fertilizers etc. It is the same as represented on page 12 of that Report, plots A to L. In 1889, plots A to F were fertilized and planted precisely like the corresponding plots from G to L as described on page 219 of the Report for 1889.

Arrangement of the Field.

The accompanying diagram page 184 will make clear the arrangement of the field and its division into strips and plots. The two strips of the previous years, running from A to F and

from G to L respectively and containing six-tenths of an acre each, were in 1890, divided as in the figure, making *four* strips running north and south each containing three-tenths of an acre and divided into six plots A_1, B_1, etc. Each plot therefore in 1890, contained $\frac{1}{20}$ of an acre.

Arrangement of the Field.

Each strip is divided into 6 plots of equal size and an area of $\frac{1}{20}$ acre. The strip running north and south from A_1 to F_1 received cow manure, A_2 to F_2 hog manure. G_1 to L_1 received mixed chemicals and G_2 to L_2 no fertilizer.

North.

F_1	F_2	L_1	L_2
E_1	E_2	K_1	K_2
D_1	D_2	J_1	J_2
C_1	C_2	I_1	I_2
B_1	B_2	H_1	H_2
A_1	A_2	G_1	G_2

South.

The same variety of maize had been raised on this land for two years previous to this experiment. The fertilizers applied and the crops harvested were both accurately weighed and analyzed and the exhaustion or enrichment of the soil calculated. The total quantities of nitrogen, phosphoric acid and potash per acre applied in the fertilizer and removed by the crops of 1888 and 1889, were as follows :

	Nitrogen.	Phosphoric acid.	Potash.
Put on in the fertilizer	90.2	214.4	155.6
Taken off in the crop	152.0	69.8	95.8
Gained, [+], or lost, [−] by the soil.	−61.8	+144.6	+59.8

A yield of 100 bushels of shelled corn per acre in 1890 would take from the soil 109 pounds of nitrogen, 47.8 of phosphoric acid and 70.5 of potash. The intention therefore was to apply nitrogen at the rate of 171 pounds per acre in order to make up for past deficiencies in the fertilizer and give a very liberal dressing for the coming season.

The strips A_1 to F_1, received 20,925 pounds or 3.2 cords of cow manure which is at the rate of 10.7 cords per acre.

The strips A_2 to F_2, received 21,141 pounds or 4 cords of hog manure which is at the rate of 13.3 cords per acre.

The strip G_1 to L_1, received a mixture of chemicals consisting of 100 pounds of nitrate of soda, 80 pounds of sulphate of ammonia, 80 pounds of dried blood, 125 pounds of cotton seed meal, 90 pounds dissolved bone black, and 40 pounds of muriate of potash which is at the rate of 1700 pounds per acre.

The strip G_2 to L_2 received no fertilizers. The analyses of the samples of manure are given on page 71, of this Report. The quantities of nitrogen, phosphoric acid, and potash in these several applications are as follows :

	Nitrogen.	Phosphoric acid.	Potash.
Strip A_1 to F_1, three-tenths of an acre	87.9	42.7	62.7
" A_2 to F_2, " " " "	122.6	170.8	21.6
" G_1 to L_1, " " " "	51.5	48.6	20.8
" G_2 to L_2, " " " "	----	----	----

The manure was plowed in. The commercial fertilizer was sowed by machine after plowing and was harrowed in.

Planting.

The rows of hills and drills were alike four feet apart. On the following plots the maize was planted in drills, the stalks to stand 10 inches apart, A_1, C_1, E_1, A_2, C_2, E_2, G_1, I_1, K_1, G_2, I_2, K_2.

On the following plots the planting was in hills 40 inches apart, stalks to stand four in a hill, B_1, B_2, H_1, H_2.

On the following plots the planting was in hills 30 inches apart, stalks to stand three in a hill, D_1, D_2, J_1, J_2.

On the following plots the planting was in hills 20 inches apart, stalks to stand two in a hill, F_1, F_2, L_1, L_2.

The planting was done May 29th by members of the Station staff with great care, dropping the seed by measuring line. Excess of seed was used to insure a full stand and when the plants were five inches high they were thinned so that the drills averaged exactly one stalk in ten inches and the variations from that distance were in all cases very small.

This arrangement of the field and fertilizers makes possible a comparison of the relative effects of planting in hills and drills on plots quite different as far as manuring goes but otherwise believed to be quite uniform in quality.

Cultivation and Notes during Growth.

The plots were all cultivated at the same time and in precisely the same way. The season was a very favorable one and the crop grew and ripened without any serious accident. Two weeks before cutting, the corn was badly beaten down by storms but it did not lie on the ground to any serious extent and ripened off well. No difference in lodging could be observed on the different strips or between the hills and drills. The following notes were made :

July 8. The maize growing on the hog manure is decidedly the tallest in the field, thicker at the butt and darker in color. Next in thriftiness appears to be that which was dressed with cow manure. The strip which received fertilizer chemicals and the one that received no fertilizer look precisely alike and are much inferior in development to the other two. The color of the foliage is paler.

There is a spot of backward, spindling growth on the north end of G_1, also on the northeast end of A_1 and on the west side of B_1.

The differences between the four strips are most striking at the south end of the field and almost disappear at the north end, though even there the maize on the hog manure is taller and thicker at the butt than the rest.

July 22. The maize growing on the hog manure is still the tallest though that on the cow manure is nearly as large. The maize on both these strips is a foot taller than that growing on chemicals, but this in turn is well ahead of the fourth strip that received no fertilizer.

Harvest.

The crops on all the plots were sampled, cut and stacked on the 29th and 30th of September in precisely the same manner as described on page 14 of the Report of this Station for 1889. Each crop was weighed and sampled from an area of $\frac{1}{40}$ acre taken from the centre of each plot.

The crops on the separate plots were husked, weighed and harvested on the 4th and 5th of November.

Results of the Experiment.

Both kernels and stover were separately analyzed. The cob was weighed but it was assumed that its composition was alike on all the plots. The error introduced by this assumption at the most can be but very slight because the total yield of cobs is very small in comparison with that of the kernels and stover. The composition of the kernels and stover from the individual plots are given in a table appended to this paper.

From the weights of the several crops and their chemical analyses the following statement of the harvest is calculated.

The first table, Table I, presents the sum of the weights of the field-cured crops on all the plots planted in drills compared with the corresponding weights of the crops from all the plots planted in hills. The dry weights of the crops and the weights of each ingredient in the crops are given also.

TABLE I.—CROPS CALCULATED TO YIELD PER ACRE IN POUNDS.

	Planted in Drills.	Planted in Hills.
Weight field-cured	14446	13278
Water	5899	5251
Dry matter	8547	8027
Ash	339	326
Albuminoids	652	611
Fiber	1746	1612
Nitrogen-free extract	5586	5274
Fat	224	204

TABLE II.—YIELD OF THE SEPARATE PLOTS. POUNDS PER $\frac{1}{40}$ ACRE.

	No. of Plot.	Fresh Weight.	Dry Weight.	Water.	Ash.	Albuminoids. (Protein.)	Fiber.	Nitrogen-Free Extract. (Starch, Gum, etc.)	Fat.
Drills dressed with cow manure	A_1	463.9	231.5	228.2	9.8	18.8	45.0	151.3	6.6
	C_1	434.0	260.4	173.6	12.5	20.0	58.6	163.8	5.5
	E_1	356.0	208.2	147.8	7.3	16.0	39.8	139.7	5.5
	Total	1253.9	700.1	549.6	29.6	54.8	143.4	454.8	17.6
Hills dressed with cow manure	B_1	411.0	226.1	184.9	8.5	18.9	42.6	150.0	6.1
	D_1	361.9	221.9	140.0	8.5	17.6	43.1	146.6	6.1
	F_1	343.5	204.1	139.4	8.4	15.8	39.5	134.9	5.5
	Total	1116.4	652.1	464.3	25.4	52.3	125.2	431.5	17.7
Drills dressed with hog manure	A_2	470.3	271.1	199.2	11.0	22.9	52.0	178.2	7.0
	C_2	389.0	232.6	156.4	9.3	18.2	48.8	149.8	6.5
	E_2	379.1	224.9	154.2	8.6	16.8	42.8	149.9	6.8
	Total	1238.4	728.6	509.8	28.9	57.9	143.6	477.9	20.3
Hills dressed with hog manure	B_2	417.9	258.0	159 9	12.8	21.3	50.4	167.2	6.3
	D_2	351.9	207.4	144.5	8.4	16.1	39.2	138.3	5.4
	F_2	369.0	221.4	147.6	9.4	17.6	43.9	145.0	5.5
	Total	1138.8	686.8	452.0	30.6	55.0	133.5	450.5	17.2
Drills dressed with fertilizer chemicals	G_1	456.0	272.0	184.3	12.1	22.3	56.7	172.9	7.7
	I_1	307.0	196.4	110.6	7.1	15.7	42.7	126.4	4.5
	K_1	302.0	184.2	117.8	6.2	14.9	37.3	121.2	4.6
	Total	1065.0	652.6	412.7	25.4	52.9	136.7	420.5	16.8
Hills dressed with fertilizer chemicals	H_1	367.1	211.2	155.9	8.4	16.8	45.5	135.4	5.1
	J_1	288.8	187.5	101.3	7.2	14.8	40.1	121.0	4.4
	L_1	268.0	159.3	108.7	6.1	12.4	34.0	103.1	3.7
	Total	923.9	558.0	365.9	21.7	44.0	119.6	359.5	13.2
Drills, no fertilizer	G_2	295.0	185.6	109.4	6.4	12.3	35.9	125.7	5.3
	I_2	235.5	135.8	99.7	4.7	8.5	28.9	90.3	3.4
	K_2	246.1	161.4	84.7	6.8	9.3	35.4	106.2	3.7
	Total	776.6	482.8	293.8	17.9	30.1	100.2	322.2	12.4
Hills, no fertilizer	H_2	323.9	212.3	111.6	8.4	13.7	43.3	141.6	5.3
	J_2	234.5	147.4	87.1	5.8	9.1	30.5	98.2	3.8
	L_2	246.0	151.6	94.4	6.0	9.3	31.5	100.9	3.9
	Total	804.4	511.3	293.1	20.2	32.1	105.3	340.7	13.0

This table shows that a larger crop and a larger yield of every food ingredient in the crop was harvested from the planting in drills than from the corresponding planting in hills.

Table II presents in detail the yield of each ingredient from each plot, of $\frac{1}{40}$ acre. From this it appears that the three plots of drills dressed with cow manure, together yielded 7.7 per cent. more dry matter than the corresponding plots in hills.

The three plots of drills dressed with hog manure together yielded 6.1 per cent. more dry matter than the corresponding plots in hills.

Dressed with commercial fertilizers the drilled plots yielded 14.8 per cent. more dry matter than the plots in hills.

Where no fertilizer was applied the yield of dry matter from the drilled plots was only 94.4 per cent. of that from the plots planted in hills.

The facts that in three experiments on manured land the planting in drills gave larger yield while on the other hand in the fourth experiment on unmanured land the planting in hills gave a larger yield, are difficult to explain except by inequalities of soil or error in weighing the crop.

An examination of the yields of the separate plots which received no fertilizer shows that the total dry matter of the crop from two of the drilled plots, I_2 and K_2 was 297.2 while from the corresponding plots planted in hills J_2 and L_2 it was 299.0, a difference of only 1.8 pounds. It also appears from the analysis of the crop of the other two plots G_2 and H_2, that the dry weights of kernels and cobs were 102.0 and 103.5 respectively. But the dry weight of stover from plot G_2 was recorded as 83.6 pounds while from H_2 it was recorded as 108.8 pounds, a difference of 25.2. The difference in yield then between the hills and drills where no fertilizer was applied lies almost wholly in the stover of a single plot.

If these weights are correct it is surprising that an increased dry weight of 25 pounds, equivalent to 37 pounds of field-cured stover should not have carried a correspondingly increased weight of ears.

An examination of the field notes shows that the weights of the three stacks on each plot was as follows :

Plot. G_2	Plot. H_2
110	131
95	106
90	87
295	324

A single stack on H_2 weighed 21 pounds more than any other of the six, a thing which happened nowhere else in the experiment, while the ears from it did not weigh more than from the others. These facts lead us to believe that there was an error in taking the weight of a single stack on plot H_2 and that where no fertilizer was applied the actual weight of crops on the drilled plots was very nearly the same as on the plots planted in hills. The general result then of the experiment is as follows:

In this experiment the maize planted in drills gave about six per cent. larger yield of dry matter than the maize planted in hills and also a larger yield of each food ingredient.

From Table II is calculated the percentage composition of the dry matter of the several crops which is as follows:

TABLE III.—PERCENTAGE COMPOSITION OF THE DRY MATTER OF THE CROPS.

	Cow Manure.		Hog Manure.		Mix'd Chemicals.		No Fertilizers.	
	Drills.	Hills.	Drills.	Hills.	Drills.	Hills.	Drills.	Hills.
Ash	4.2	3.9	3.9	4.4	3.8	3.9	3.7	3.9
Albuminoids	7.8	8.0	7.9	8.0	8.1	7.9	6.2	6.2
Fiber	20.5	19.2	19.7	19.4	20.9	21.4	20.8	20.6
Nitrogen-free Ex.	65.0	66.2	65.7	65.7	64.7	64.4	66.7	66.8
Fat	2.5	2.7	2.8	2.5	2.5	2.4	2.6	2.5
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

This statement of percentage composition shows two things,

1. The composition of the crop and therefore its feeding value per pound was practically the same whether planted in hills or in drills.

2. The composition of the crops grown on the different fertilizers is practically the same; but where no fertilizer was applied the per cent. of albuminoids in the crop is about 1.7 lower with a corresponding increase in the per cent. of fiber and nitrogen-free extract.

In considering these results it should be remembered that in 1888 and 1889 this land had received very considerably more of both potash and phosphoric acid than had been removed in the crops of those years, but that on the other hand the crops had removed some 60 pounds more of nitrogen from the soil per acre than had been replaced and therefore it is fair to assume that in the spring of 1890 the nitrogen of the soil was relatively at a minimum, as compared with potash and phosphoric acid. Hence where no fertilizer was applied in 1890 it was to be expected that the crop

would be reduced in quantity and would be less rich in nitrogenous substance, as a result of a striking deficiency of food supply. It is altogether likely that a considerable deficiency of either potash or of phosphoric acid would have a like effect.

It has also been shown by our experiment of the two preceding years that the per cent. of albuminoids in the crop may be strikingly increased or decreased by changing the distance of planting. To illustrate :—

The per cent. of albuminoids in the dry matter of the crops grown last year on this same land was as follows—Report for 1889, page 223 :

Distance of Planting.	Per cent. of Albuminoids in Crop.
One stalk in four feet	8.7
" " two "	7.9
" to a foot	6.4
Two stalks to a foot	5.7
Four " " "	5.6
Eight " " "	5.9

These are illustrations of a general rule that an abundant and not excessive supply of heat, water and plant food and a full supply of light are necessary for the fullest production of crop and that when the supply of either one of these factors of vegetable production is reduced beyond a certain limit the exigency is shown by a striking decrease in the proportion of nitrogenous matter which is most intimately associated with the growth and activity of assimilating cells and in consequence with the reserve supply in the seed.

The following table (Table IV), shows the largest crops of dry matter, reckoned to the acre, which were harvested in 1888 and 1889 and their percentage composition together with all crops from drills in 1890 calculated to an acre. The rows were four feet apart in all three years.

The plots marked A were on cow manure, B were on hog manure, C on commercial fertilizers, and D had no fertilizer.

As it is customary to judge of a maize crop by the yield of "shelled corn" in bushels, the yields have also been calculated in this way with the results given in the fourth column of the table. In this calculation twenty per cent. has been added to the weight of water-free kernels for the water in corn cured enough to shell and 50 pounds has been assumed as the weight of such shelled corn per bushel.

TABLE IV.—YIELD OF DRY MATTER AND "SHELLED CORN" PER ACRE FOR THREE YEARS.

Year.	Distance of Planting.	Yield of Dry Matter per Acre.	Bushels of Sound Shelled Corn.	Percentage Composition of Dry Matter. Ash.	Albuminoid.	Fiber.	Nitrogen-free Extract.	Fat.
1888	Stalks 12 inches apart,	7350	75	3.3	7.8	19.4	66.1	3.4
1888	" 6 " "	7980						
1889	" 12 " "	6144	60	3.5	6.1	21.7	69.7	3.0
1889	" 6 " "	6352						
1890A	" 10 inches apart,	9014	91	4.0	7.9	19.8	65.7	2.6
1890B	" 10 " "	9436	97	4.2	8.0	19.6	65.5	2.7
1890C	" 10 " "	8070	87	3.9	8.0	21.2	64.4	2.5
1890D	" 10 " "	6626	51	3.8	6.2	20.7	66.7	2.6

The next table, Table V, explains the last one by showing the quantities of nitrogen, phosphoric acid and potash applied each year to the soil in the fertilizer and the quantities annually removed in the crops and the consequent exhaustion or enrichment of the soil. The phosphoric acid and potash in the crops of 1890 were not determined but have been assumed to have the same relation to the nitrogen of the crops as they had in the crop of 1888.

TABLE V.—POUNDS OF NITROGEN, PHOSPHORIC ACID AND POTASH PUT ON IN FERTILIZER AND TAKEN OFF IN MAIZE CROP FOR THREE YEARS.

	Nitrogen.	Phosphoric acid.	Potash.
Put on in fertilizer in 1888 per acre	45.1	107.2	77.8
Taken off in crop in 1888 per acre	94.8	39.4	50.2
Gained (+), or lost (−) by the soil in 1888	−49.7	+67.8	+27.6
Put on in fertilizer in 1889 per acre	45.1	107.2	77.8
Taken off in crop in 1889 "	60.9	28.7	48.5
Gained or lost by the soil in 1889	−15.8	+78.5	+29.3
Gained or lost by the soil per acre in two years' cropping	−65.5	+146.3	+56.9
Put on in cow manure per acre in 1890	293	142	209
Taken off in crop per acre in 1890	114	47	60
Gained or lost by the soil per acre in 1890	+179	+95	+149
Put on in hog manure per acre in 1890	409	569	72
Taken off in crop per acre in 1890	120	50	64
Gained or lost by the soil per acre in 1890	+289	+519	+8
Put on in mixed chemicals per acre in 1890	172	162	69
Taken off in crop per acre in 1890	103	43	55
Gained or lost by the soil per acre in 1890	+69	+119	+14
Taken off in crop in 1890 from land which received no fertilizer	66	27	37
Gained or lost by the soil per acre in 1890	−66	−27	−37

The gain or loss of these three ingredients by three years cropping with maize expressed in pounds per acre is as follows:

	Nitrogen.	Phosphoric acid.	Potash.
Dressed with cow manure in 1890	+114	+241	+106
" " hog " " "	+224	+665	+ 65
" " mixed chemicals "	+ 4	+265	+ 71
No fertilizers in "	—132	+119	+ 22

In 1888 the available nitrogen supply from the fertilizer and the decaying turf were presumably sufficient for the needs of the maize crop. In 1889 the supply was probably quite insufficient while in 1890 it was probably quite in excess of the needs of the crop, at least where cow manure and hog manure were applied.

TABLE VI.—ANALYSES OF FIELD-CURED MAIZE KERNELS FROM THE PLOTS DESCRIBED IN THIS PAPER.

Plot.	ANALYSES.						ANALYSES, CALCULATED WATER-FREE.				
	Water.	Ash.	Protein.	Fiber.	Nitrogen-Free Extract. (Starch, Gum, etc.)	Fat.	Ash.	Protein.	Fiber.	Nitrogen-Free Extract. (Starch, Gum, etc.)	Fat.
A_1	38.11	.96	6.84	1.27	49.45	3.37	1.55	11.06	2.05	79.90	5.44
C_1	37.00	.85	6.43	1.15	51.46	3.11	1.35	10.15	1.82	81.77	4.91
E_1	36.93	.78	6.37	.96	51.91	3.05	1.24	10.10	1.53	82.29	4.84
A_2	36.20	.98	7.26	1.03	51.29	3.24	1.54	11.39	1.62	80.37	5.08
C_2	37.86	.85	6.51	1.01	50.75	3.02	1.37	10.46	1.63	81.67	4 87
E_2	36.08	.85	6.75	1.04	52.15	3.13	1.33	10.47	1.62	81.67	4.91
G_1	38.24	.97	6.64	1.21	49.92	3.02	1.57	10.78	1.97	80.78	4.90
I_1	38.38	.76	6.62	1.23	50.24	2.77	1.24	10.77	2.01	81.48	4 50
K_1	38.91	.81	6.39	1.12	50.11	2.66	1.36	10.46	1.82	82.00	4.36
G_2	37.59	.93	5.66	1.17	51.61	3.04	1.49	9.05	1.90	82.69	4.87
I_2	37.71	.79	5.44	1.18	51 97	2.91	1.27	8.74	1.89	83.34	4.76
K_2	35.60	.79	5.31	1·22	54.25	2.83	1.23	8 27	1.90	84.19	4.41
B_1	37.13	.83	6.52	1.25	51.05	3.22	1.36	10.37	2.05	81.11	5.11
D_1	35.24	.87	6.60	1.19	52.81	3.29	1.30	10.19	1.84	81.59	5.08
F_1	37.81	.84	6.30	1.05	51.03	2.97	1.36	10.16	1.69	82.00	4.79
B_2	36.43	.91	6.84	1.11	51.68	3.03	1.42	10.76	1.74	81.33	4.75
D_2	37.50	.81	6.47	1.08	51.28	2.86	1.32	10.43	1.74	81.91	4.60
F_2	38.43	.77	6.29	1.00	50.58	2.83	1.26	10.28	1.63	82.20	4.63
H_1	46.02	.79	5.80	1.08	43.73	2.58	1.46	10.78	2.00	80.97	4.79
J_1	37.79	.83	6.71	1.34	50.60	2.73	1.34	10.79	2.13	81.34	4.40
L_1	41.87	.78	6.05	1.23	47.72	2.35	1.29	10.40	2.12	82.14	4.05
H_2	36.44	.90	5.88	1.20	52.52	3.06	1.41	9 25	1.86	82.68	4 80
J_2	37.40	.81	5 31	1.19	52.41	2.88	1.30	8.50	1.92	83.66	4.62
L_2	38.06	.78	5.57	1.12	51.69	2.78	1.26	9.03	1.82	83.38	4.51

TABLE VII.—ANALYSES OF FIELD-CURED MAIZE STOVER FROM THE PLOTS DESCRIBED IN THIS PAPER.

Plot.	ANALYSES.						ANALYSES, CALCULATED WATER-FREE.				
	Water.	Ash.	Protein.	Fiber.	Nitrogen-Free Extract, (Starch, Gum, etc.)	Fat.	Ash.	Protein.	Fiber.	Nitrogen-Free Extract, (Starch, Gum, etc.)	Fat.
A_1	59.17	2.93	2.61	13.55	21.26	.48	7.17	6.40	33.22	52.04	1.17
C_1	42.20	4.12	3.90	19.66	29.49	.63	7.12	6.75	33.84	51.04	1.25
E_1	46.02	3.59	3.64	17.87	28.11	.77	6.67	6.74	33.09	52.08	1.42
A_2	47.78	3.74	3.52	17.05	27.23	.68	7.16	6.75	32.64	52.14	1.31
C_2	41.60	3.81	3.95	19.63	30.26	.75	6.51	6.78	33.61	51.82	1.28
E_2	45.04	3.63	3.14	17.52	30.00	.67	6.63	5.70	31.86	54.59	1.22
G_1	42 52	4.23	4.08	20.10	28.31	.76	7.35	7.09	34.98	49.25	1.33
I_1	34.00	4.15	4.27	22.93	33.86	.79	6.25	6.44	34.87	51.24	1.20
K_1	39.38	3.90	4.03	20.75	31.19	.75	6.44	6.65	34.23	51.45	1.23
G_2	36 11	4.08	3.28	22.28	33.49	.76	6.36	5.12	34.88	52.44	1.20
I_2	45.43	3.02	2.98	17.86	29.87	.84	5.53	5.47	32.73	54.73	1 54
K_2	33.12	4.32	3.34	22.40	35.83	.99	6.47	5.00	33.49	53.57	1.47
B_1	51.72	3.29	3.58	15.52	25.29	.60	6.78	7.40	32.16	52.42	1.24
D_1	42.52	3.86	3.73	19.02	30.09	.78	6.72	6.49	33.09	52.34	1.36
F_1	43.68	4.38	3.66	19.07	28.47	.74	7.79	6.50	33.84	50.55	1.32
B_2	39.87	5.06	4.37	19.36	30.63	.71	8.41	7.27	32.19	50.95	1.18
D_2	44.69	4.36	3.58	17.94	28.69	.74	7.85	6.49	32.46	51.87	1.33
F_2	41.72	4.32	3.79	19.73	29.69	.75	7.41	6.50	33.87	50.94	1.28
H_1	38.62	4.31	4.20	21.27	30.88	.72	7.01	6.81	34.69	50.33	1.16
J_1	31.75	4.33	4.67	23.82	34.52	.91	6.35	6.80	34.92	50.59	1.34
L_1	39.10	3.58	3.57	21.70	31.35	.70	5.86	5.84	35.63	51.52	1.15
H_2	32.49	4.25	3.63	22.24	36.54	.85	6.29	5.37	32.94	54.11	1.29
J_2	36.76	3.76	3.20	21.34	34.06	.88	5.94	5.07	33.75	53.85	1.39
L_2	38.64	4 16	2.85	21.28	32.20	.87	6.79	4.64	34.68	52.49	1.40

ON DETERMINATION OF PHOSPHORIC ACID IN PRESENCE OF IRON AND ALUMINA.

By S. W. Johnson and T. B. Osborne.

In our paper on Determination of Phosphoric Acid in Fertilizers by the "Citrate Method," published in the Annual Report of this Station for 1889, we have stated that while by use of a certain modification of the citrate method satisfactory results were obtained in the analyses of fertilizers containing calcium phosphates, the same method applied to fertilizers containing notable quantities of iron or aluminum, gave varying percentages of phosphoric acid. We also found, in endeavoring to control our work by the rapid molybdic method now "official" in the United States, that it yielded no constant results in presence of iron and aluminum.

To quote from the paper referred, p. 261, "We had intended to give here the data for comparing the citrate method with the molybdic method in case of Thomas-Slag and Keystone Phosphate, but notwithstanding we have made many determinations and have many results by the molybdic method, we are as yet uncertain what is the true percentage of phosphoric acid in these substances and have to defer the consideration of that point to a future publication."

The method now "official" and generally employed in the United States for the determination of phosphoric acid in fertilizers, based on the use of molybdic acid in nitric acid solution, while entirely satisfactory in absence of iron and aluminum gives incorrect and in general too high results when these metals are present in considerable quantities.

In the original molybdic method as elaborated by Sonnenschein the cold solution of the substance in sulphuric or nitric acid is mixed with a large excess of molybdic solution and kept for 4 to

6 hours at a temperature near to but not exceeding 50° C. The yellow precipitate thus formed when washed with diluted molybdic solution, contains all the phosphoric acid and no bases except ammonia.

The method as modified for rapid work and now adopted by the American Association of Official Agricultural Chemists differs from the original mainly in precipitating from *hot* solutions and digesting for one hour at 65° C. When iron and aluminum are in the solution these metals are to some extent carried down with the yellow precipitate, and when this is dissolved in ammonia they are also dissolved and pass into the alkaline filtrate and thence into the magnesium phosphate.

It also easily happens that the conditions are such as to prevent all the phosphoric acid from entering the precipitate. This error is due to excess of nitric acid in the solution of the substance, or to relative deficiency of molybdic acid.

The extent to which iron and aluminum may contaminate the magnesium pyrophosphate is variable according to the acidity of the solution and the temperature at which the yellow molybdic precipitate is formed. The amount of phosphoric acid that may escape precipitation is also subject to variation, as a consequence the results commonly do not agree closely together, even in case of duplicate analyses carried on simultaneously, unless extreme care is taken to keep all the conditions strictly alike.

The amount of error thus occasioned in the hands of skilful analysts is shown by the subjoined figures.

The first results below stated were obtained with a carefully prepared solution containing very exactly 18.93 per cent. of P_2O_5 together with approximately 20 per cent. of Fe_2O_3, 4.72 per cent. of Al_2O_3 and 5.09 per cent. of MnO. These bases were present in the form of sulphates. The phosphoric acid was supplied in a solution of sodium phosphate whose content of P_2O_5 was fixed by repeated determinations with magnesium mixture. The weighed salts were dissolved together to a clear solution with help of nitric acid.

The results marked (O)* were mostly got in our private laboratory and with different reagents and on different solutions from those marked (W) and (C), which were made in the Station Laboratory by Messrs. Winton and Curtiss, respectively.

* By T. B. Osborne.

COMPARISON OF THE ORIGINAL AND THE "OFFICIAL" MOLYBDIC METHODS FOR DETERMINING PHOSPHORIC ACID IN PRESENCE OF IRON AND ALUMINUM.

	Prepared solution (P_2O_5=18.93 p. c.)	Thomas-Slag.	Keystone Concentrated Phosphate.	Grand Cayman Rock.	Bolivian Guano.	Superphosphate. No. 2447.	"Bone." No. 2452.	Prepared mixture of clean bone dust and diluted H_2SO_4.
Sonnenschein's Original Method	18.92, 18.94 (O.)	18.63 (W.) 18.65 (C.) 18.65, 18.65 (O.)	44.86, 44.86, 44.67 (O.) 44.84, 44.86 (O.) 44.84, 44.94 (W.) 45.01, 44.59 (C.)	25.47, 25.54 (O.)	16 96 (O.)	18.56, 18.37 (O.)	18.21 (O.)	22.98, 22.98 (O.)
Official Method now used in U.S.	19.26, 19.26 (O.)	19.26, 19.14 (O.)	46.68, 46.56 (O.) 47.89, 47.48 (C.) 46.19, 46.32 (W.) 45.25 (O.)	26.02 (O.) 26.12, 26.18	17.02 (O.) 17.09, 17.13 17.14, 17.24	19.14 (O.) 18.96, 19.04	18.37 (O.) 18.58, 18.52	22.91, 23.04 (O.)

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TWENTY-THIRD REPORT

OF THE

SHEFFIELD SCIENTIFIC SCHOOL

OF

YALE UNIVERSITY,

1889-90.

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REPORT

OF THE

STATE BOARD OF VISITORS.

To the General Assembly of the State of Connecticut:

In pursuance of the Act providing for the appointment of the Board of Visitors of the Sheffield Scientific School, I have the honor to report, that the Board have visited the School, inspected its equipment, and investigated its methods and facilities for instruction, and cheerfully commend the needs of the School as presented in the 23d Report of the Governing Board, which is herewith transmitted, and commended to your careful and intelligent consideration.

MORGAN G. BULKELEY,
Chairman.

BIENNIAL STATEMENT

OF THE

GOVERNING BOARD.

In presenting their regular Biennial Report the Governing Board of the Sheffield Scientific School can hardly fail to call attention in the first place to the rapid increase in the number of its students. This is the most noticeable fact in the history of the last three years. In the academic year, 1888–9, the total number in attendance was 305. In the following year it rose to 343. In the present year it has reached 381.

In one sense this is a most gratifying tribute to the success of the efforts made by the Governing Board to keep the institution in the front rank of those which are devoted to the furtherance of scientific education. Its students, as might be expected, come largely from Connecticut. But it also draws them from the most remote States and Territories, and draws them in constantly increasing numbers. This is as satisfactory evidence as can be given that the advantages furnished by the school are coming to be more and more widely appreciated in all parts of the country.

While this, however, is in many respects gratifying, it has its unfortunate side. The increasing number of students puts more and more to the severest test the resources of the school both in the matter of equipment and instruction. This pressure has been steadily felt for years, but it is more plainly felt now than ever before. The buildings once thought ample to accommodate students for a long period beyond the present time are proving utterly inadequate to meet the demands made upon them. More rooms and larger rooms, further increase of laboratories, both in size and number, and additional buildings are imperatively required in order that the school shall keep pace with the numerous excellent institutions of the same character that are scattered throughout the country. The conversion of the Sheffield man-

sion into a biological laboratory—an account of which will be found later—relieved for but a short time the pressure upon the chemical department. The rapid increase in the number of students speedily filled all the places made vacant by this transfer, and the Governing Board will be again speedily confronted with the same problem of how to provide for the proper instruction of students with the crowded accommodations now at their disposal. Though the past ten years have witnessed the reception of several valuable benefactions, these gifts are far from obviating

The Necessity of Increased Endowments.

It is to be borne in mind that with much inferior resources the Sheffield Scientific School has a much larger body of students in attendance than many of the older institutions of the country. In fact, comparatively few equal it in this particular. In the other New England colleges, outside of Boston, Cambridge and New Haven, it has in this respect no rivals. It has, for instance, a larger body of students than either Amherst or Williams, or Brown University or the undergraduate departments of Dartmouth, the four institutions which come the nearest to it in point of numbers. Yet in many respects it lacks the facilities for imparting effective instruction which those colleges in one way or another possess. It is hardly necessary to say to intelligent men that education is always expensive, and the higher the grade, the more expensive it becomes. Still it is only those, even among educated men, who have paid special attention to the subject that have any adequate conception of its necessary costliness. The Sheffield Scientific School is one of the three or four Land-grant colleges which has never received any appropriations from the State in which it is situated. Several of its sister institutions have received from such sources aid to the extent of hundreds of thousands of dollars, in the past, and are likely to receive still more in the future. The Governing Board of the Sheffield Scientific School have never desired any appropriation, have never asked for it, nor do they find any fault with the policy which is averse to granting it. Its growth in numbers and in reputation must be due in the future as it has been in the past to the generous interest taken in it by those who appreciate its work, and not to any assistance or aid that it will receive directly from the State. It was the munificent gift of more than a million of dollars from the

benefactor from whom it receives its name, coupled with the privilege of using the great collections of Yale University, that has enabled it to take its place among the foremost institutions of the country that are devoted to the development of scientific education.

The position that has been gained it is desirable both for the credit of the institution and of the State that it should retain. But to do so, it must have additional facilities speedily. There is not only immediate necessity of more rooms and larger rooms to accommodate the increasing numbers, but also an increase in the teaching force for this same purpose. But there is one thing in particular to which it is necessary again to call attention. There is the most pressing need of a new building for the department of Civil and Mechanical Engineering, which should include Mechanical and Physical Laboratories, with facilities for practical instruction in Electro-Technics. The constantly increasing attention paid to the subject of electricity, and the development it is steadily undergoing render this a matter of the utmost immediate importance, especially in a State like Connecticut in which manufacturing interests occupy so prominent a position and are destined, in the near future, to occupy one even more prominent. It is here that the lack of sufficient facilities is now specially felt. Whatever means are offered to secure them will be utilized to the full extent of which they are capable. But it is important to make the fact prominent at the outset that a building for the purpose designed, and amply equipped for its special work, will cost, at least, one hundred and fifty thousand dollars. In addition to this its running expenses will involve an expenditure of seven or eight thousand dollars a year. However large these sums may appear, they are small compared with the establishments for the same purpose that are put up in Europe and are beginning to be put up in this country. It is to be hoped that the pressing need of a building of this character will be borne in mind by the graduates and friends of the institution, who recognize the necessity of properly fitting men to deal successfully with this new department of scientific study, which has now come so rapidly to the front.

Addition to the Funds.

The resources of the school have during the past two years however, met with considerable increase. Mrs. Sheffield, who

had always been one of the warmest friends of the institution, which bears her husband's name, died on April 21, 1889. By her death the Trustees of the school came into possession of productive real estate, to the value of $75,000, in which she had had a life interest. That same year Mrs. Henry Farnam made a generous contribution of the sum of $2,000 for current income, which she has repeated the present year, making $4,000 in all.

The Governing Board also acknowledge the reception of a gift of $20,000 bequeathed them by the late James E. English, formerly Governor of the State. The duties of Mr. English as Governor compelled him to make an examination of the character and management of the school. As a result he became warmly interested in it, and remaining during his life one of its staunchest and most earnest friends. In a period when it was in financial straits he generously contributed $5,000 to its support, and the additional sum of $20,000, he left in his will for the purpose of endowing the chair of Mathematics.

Gifts.

The following gifts to the department of Mechanical Engineering are gratefully acknowledged.

From Mr. James A. Seymour, (class of 1885), of the firm of McIntosh, Seymour & Co., Auburn, N. Y., an Automatic Vertical Steam Engine, of four-horse power.

From the Walker Manufacturing Company of Cleveland, Ohio, a set of twelve large framed photographs of heavy machinery.

While the courtesy of many manufacturing establishments in the State in allowing students occasional access to inspect their operations is fully appreciated, special acknowledgment must be made to the New Haven Manufacturing Company for permitting daily visits of the classes to their shops for the study of machines and processes. The opportunity these visits afford the students of obtaining a knowledge of good machine shop practice is something, the value of which can not be too highly estimated, and the obligation to those granting it can not be too cordially expressed.

After the death of Mrs. Sheffield the Trustees of the school purchased the life-interest of Mr. George St. John Sheffield in the Sheffield homestead. This now goes under the name of

The Biological Laboratory.

Previous to this time the Governing Board of the School had entered into an agreement with the Academical Department to provide instruction in Biology for a limited number of students from the Junior and Senior classes. The facilities of the then existing biological laboratories were, however, wholly inadequate to meet the growing demand for instruction in this department of the School and it was a difficult problem to decide how best to provide the necessary room for the proper expansion of this line of study. The acquisition of the Sheffield mansion offered a ready solution of the problem, and the Governing Board soon decided to convert the newly acquired building into a biological laboratory, in which all of the special studies of the biological course could be grouped together, viz : physiological chemistry, physiology, comparative anatomy, botany and general biology.

The work of reconstruction was commenced in June and on the opening of the term, in September, 1889, the building was ready for occupancy and thoroughly equipped with the apparatus and material needful for this line of work.

Fortunately, the large and roomy mansion proved well adapted for the purpose in view. On the ground floor, especially, many of the rooms were sufficiently large and well lighted to meet the requirements for a laboratory without much change ; where this was not the case, the removal of a few partition walls made possible the union of adjacent apartments, thus giving commodious rooms well suited for laboratory purposes. A few additional windows were needed to give sufficient light for microscopical work, and several outside chimneys were built to furnish the necessary ventilation flues for the chemical laboratories. Aside from these minor changes, the external appearance of the building remains substantially the same as before its occupancy as a laboratory. In order to provide for the suitable removal of all waste matter from the laboratories, a good sized sewer of several hundred feet in length, with suitable man holes, was built upon the newly acquired land and connected with the city's sewer on Grove street. In this way the needs of the present building were well provided for, while at the same time provision was made for the future, inasmuch as any new buildings erected upon this plot can be drained through the same channel.

General Plan of the Interior.

The arrangements of rooms in the reconstructed building is as follows: The first floor is given up wholly to physiological chemistry and physiology. The parlor and a portion of the main hall, occupying the front of the main part of the house, have been united by the removal of the partition wall, and the large room which resulted has been converted into a lecture room for physiology and physiological chemistry. This room has a capacity for seating fifty persons and is provided with a long lecture table, fitted up with a pneumatic trough, sink, suction pump and other facilities for experimental lectures on these topics. There is likewise a large case on one side of the room for models and other appliances useful in the teaching of physiology. Connecting with this room, and with the adjacent laboratories, is a small room, formerly the parlor boudoir, which has been changed into a preparation room in which the experiments illustrative of the lectures can be arranged. The room can also be advantageously used as a private laboratory.

Directly back of the lecture room, in the central portion of the building, are two large rooms connecting with each other by a large hallway, formerly occupied as sitting room and dining room. These two rooms have been changed into research laboratories, where the more advanced work in physiological chemistry can be carried on. Large and commodious hoods were constructed, cases for apparatus, convenient working tables well supplied with gas and water, and other appliances necessary in laboratories of this order. The large butler's pantry adjacent to the dining room has been changed into a reagent closet, and one or two other small rooms have been utilized as storage closets for apparatus.

On each side of the main house is a large wing. The one to the north, comprising the former library and music room, has been made into a laboratory of physiological chemistry, for the use of students from the Academical Department taking the optional course in Biology. The two rooms have made a well lighted and commodious laboratory with accommodations for twenty persons, in addition to the hoods and other structures needed for general use. In the other wing, the one to the south, there were two main rooms, the picture gallery and a small parlor; these, together with a small hallway, were united by the

removal of the partition walls and one large room obtained, which has been fitted up as a laboratory of physiological chemistry for the use of the students of the Scientific School taking the biological course. This room has accommodations for twenty persons in addition to tables and hoods for general use. Connected with this room is a smaller room used as a library and balance room. There is likewise a second small room provided with a large stone sink, designed especially for dialysis and other like purposes.

There are thus in the several laboratories of physiological chemistry accommodations for fifty to sixty persons, each working space being at least five feet long. Each desk or table is provided with four drawers and two lockers for apparatus, etc., large roomy sinks, pumps for rapid filtration and shelves for reagent bottles. All of the table tops are of heavy quartered oak, while the standing work is of clear pine, finished in the natural wood. The sinks are of iron, trapped and ventilated, while all drainage pipes in the building are of extra weight iron and exposed to view or laid in troughs which can be readily uncovered. The hoods are all floored with slabs of soapstone, to resist the action of chemicals and to diminish the danger of fire. In the several hoods are banks of constant level water-baths by which continuous evaporations can be carried on. Microscopes, balances for coarse and fine weighing, water-blast-lamps and other facilities for convenient and rapid work have been introduced. As a result, the laboratories of physiological chemistry are now the best equipped of any in the School, while the large, airy and well-lighted rooms make comfortable and agreeable places for work.

The second floor of the building is occupied as follows: The front room of the main building has been converted into a lecture room for comparative anatomy and botany, while the two small rooms adjoining it are used as private rooms for the professors of these two departments. The large room in the north wing has been made into a botanical laboratory, where instruction is given to students from both Departments—the Academical and Scientific. The three large rooms on the west side of the building have been converted into laboratories for instruction in general biology, comparative anatomy, and histology. These rooms are used in common by the Scientific and Academical classes in Biology, but

in alternate terms. The central room is fitted up with cases for specimens and apparatus, microtomes, etc., and is reserved mainly for apparatus, general demonstrations and the use of the instructors. The other two apartments are fitted up with table room for thirty students, each place being provided with ample drawers, lockers and shelving for microscopes, etc.

Twenty new microscopes and other apparatus sufficient for the increased number of students have been added to the outfit. The third floor which contains several available rooms is not at present occupied, but is reserved for possible future growth and expansion.

The basement contains the coal and furnace rooms, storage rooms for apparatus, a room for the preparation of solutions and general chemical work, and a large frog tank supplied with running water.

The building, which has been named the Sheffield Biological Laboratory, can easily accommodate, with its present outfit, one hundred students and, as already stated, an effort has been made to introduce all the necessary appliances for thorough instruction and investigation in the branches of Biology represented in the Biological course.

Military Instruction.

At the request of the Governing Board for an officer of the United States Army to furnish fuller instruction in Military science, Charles A. L. Totten, first lieutenant in the 4th United States Artillery, was detailed for service at this institution by order No. 152, from the War Department, Adjutant-General's office, issued in July, 1889. Lieutenant Totten arrived here in the following month, and began his instruction the same Academic year. The particular method followed will be found in the account given of the courses of instruction in the appended catalogue. The result of this detail has been to give scope to this special branch, and to arouse increased interest in those students who are inclined to pay attention to military science.

The labors of Lieutenant Totten have been in other ways advantageous to the State. He has, with the consent of the Governing Board, held himself so far as he was able, at the service of volunteer organizations who were in need of his advice or

assistance. In particular, during a part of the last year, he was nominally in charge of the Battalion of the Bridgeport High School, and weekly during the spring drilled the Governor's Foot Guards at Hartford.

Addition to the Fund for the Land-Grant Colleges.

The present Congress has passed the following act, which is of so much importance to the interests of this school, that it is desirable to give it in full.

AN ACT to apply a portion of the proceeds of the public lands to the more complete endowment and support of the Colleges for the benefit of Agricultural and the Mechanic Arts established under the provisions of an Act of Congress approved July second, eighteen hundred and sixty-two.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That there shall be, and hereby is, annually appropriated, out of any money in the Treasury not otherwise appropriated, arising from the sales of public lands, to be paid as hereinafter provided, to each State and Territory for the more complete endowment and maintenance of colleges for the benefit of agriculture and the mechanic arts now established, or which may be hereafter established, in accordance with an act of Congress approved July second, eighteen hundred and sixty-two, the sum of fifteen thousand dollars for the year ending June thirtieth, eighteen hundred and ninety, and an annual increase of the amount of such appropriation thereafter for ten years by an additional sum of one thousand dollars over the preceding year, and the annual amount to be paid thereafter to each State and Territory shall be twenty-five thousand dollars to be applied only to instruction in agriculture, the mechanic arts, the English language and the various branches of mathematical, physical, natural and economic science, with special reference to their applications in the industries of life, and to the facilities for such instruction: *Provided,* That no money shall be paid out under this act to any State or Territory for the support and maintenance of a college where a distinction of race or color is made in the admission of students, but the establishment and maintenance of such colleges separately for white and colored students shall be held to be a compliance with the provisions of this act if the funds received in such State or Territory be equitably divided as hereinafter set forth: *Provided,* That in any State in which there has been one college established in pursuance of the act of July second, eighteen hundred and sixty-two, and also in which an educational institution of like character has been established, or may be hereafter established, and is now aided by such State from its own revenue, for the education of colored students in agriculture and the mechanic arts, however named or styled, or

whether or not it has received money heretofore under the act to which this act is an amendment, the Legislature of such State may propose and report to the Secretary of the Interior a just and equitable division of the fund to be received under this act between one college for white students and one institution for colored students established as aforesaid, which shall be divided into two parts and paid accordingly, and thereupon such institution for colored students shall be entitled to the benefits of this act and subject to its provisions, as much as it would have been if it had been included under the act of eighteen hundred and sixty-two, and the fulfillment of the foregoing provisions shall be taken as a compliance with the provision in reference to separate colleges for white and colored students.

SEC. 2. That the sums hereby appropriated to the States and Territories for the further endowment and support of colleges shall be annually paid on or before the thirty-first day of July of each year, by the Secretary of the Treasury, upon the warrant of the Secretary of the Interior, out of the Treasury of the United States, to the State or Territorial Treasurer, or to such officer as shall be designated by the laws of such State or Territory to receive the same, who shall, upon the order of the trustees of the college, or the institution for colored students, immediately pay over said sums to the treasurers of the respective colleges or other institutions entitled to receive the same, and such treasurers shall be required to report to the Secretary of Agriculture and to the Secretary of the Interior, on or before the first day of September of each year, a detailed statement of the amount so received and of its disbursement. The grants of moneys authorized by this act are made subject to the legislative assent of the several States and Territories to the purpose of said grants: *Provided*, That payments of such installments of the appropriation herein made as shall become due to any State before the adjournment of the regular session of legislature meeting next after the passage of this act shall be made upon the assent of the governor thereof, duly certified to the Secretary of the Treasury.

SEC. 3. That if any portion of the moneys received by the designated officer of the State or Territory for the further and more complete endowment, support and maintenance of colleges, or of institutions for colored students, as provided in this act, shall, by any action or contingency, be diminished or lost, or be misapplied, it shall be replaced by the State or Territory to which it belongs, and until so replaced no subsequent appropriation shall be apportioned or paid to such State or Territory; and no portion of said moneys shall be applied, directly or indirectly, under any pretense whatever, to the purchase, erection, preservation, or repair of any building or buildings. An annual report by the president of each of said colleges shall be made to the Secretary of Agriculture, as well as to the Secretary of the Interior, regarding the condition and progress of each college, including statistical information in relation to its receipts and expenditures, its library, the number of its students and professors, and also as to any improvements and experiments made under the direction of any experiment stations

attached to said colleges, with their costs and results, and such other industrial and economical statistics as may be regarded as useful, one copy of which shall be transmitted by mail free to all other colleges further endowed under this act.

SEC. 4. That on or before the first day of July in each year, after the passage of this act, the Secretary of the Interior shall ascertain and certify to the Secretary of the Treasury as to each State and Territory whether it is entitled to receive its share of the annual appropriation for colleges, or of institutions for colored students, under this act, and the amount which thereupon each is entitled, respectively to receive. If the Secretary of the Interior shall withhold a certificate from any State or Territory of its appropriation the facts and reasons therefor shall be reported to the President, and the amount involved shall be kept separate in the Treasury until the close of the next Congress, in order that the State or Territory may, if it should so desire, appeal to Congress from the determination of the Secretary of the Interior. If the next Congress shall not direct such sum to be paid it shall be covered into the Treasury. And the Secretary of the Interior is hereby charged with the proper administration of this law.

SEC. 5. That the Secretary of the Interior shall annually report to Congress the disbursements which have been made in all the States and Territories, and also whether the appropriation of any State or Territory has been withheld, and if so, the reasons therefor.

SEC. 6. Congress may at any time amend, suspend, or repeal any or all of the provisions of this act.

Approved, August 30, 1890.

DEATH OF PROFESSOR LYMAN.

For the second time in the history of the School the Governing Board are under the painful necessity of chronicling the loss of one of their number by death. On the 29th of January, 1890, died at his home in New Haven, Professor Chester S. Lyman, who for more than thirty years had been connected with this institution. Since 1886 increasing infirmities had rendered it impossible for him to perform any active service ; but up to that time he had discharged without any intermission the duties of his various positions.

Professor Lyman was born in Manchester, Conn., on January 13, 1814. He was early interested in scientific studies, his attention having been specially turned to astronomy. Having, however, concluded to take up the profession of the ministry he entered Yale College with that intention, and was graduated in 1837. During his course he was specially marked by his literary tastes, and was one of the founders of the Yale Literary Magazine, the oldest college periodical now existing in the country.

After graduation he taught for two years and then began the study of theology at the Union Theological Seminary in New York. Subsequently he went to the Yale Divinity School, and from that he graduated in 1842. In that year he was called to the pastorate of the first Congregational Church in New Britain. There, however, he did not long remain. His health speedily gave way, and in April, 1845, he gave up his pastorate, and soon set out for another climate in the hope of regaining his health.

In October he sailed for the Hawaiian Islands, where he remained for over a year. There his tastes prompted him to pay special attention to subjects connected with science, and he made a series of observations upon the volcano of Kilauea which attracted much attention by their announcement of certain hitherto unrecognized principles of volcanic action. While in the Sandwich Islands he was engaged for several months, also in teaching at the Royal School. Among his pupils were four young chiefs who successively ascended the throne. In the Hawaiian Islands he remained till June, 1847, when he set sail for California, which had recently come into the possession of the United States.

In California he remained between two and three years, engaged principally in surveying. He was there when the first discoveries of gold were made, and his account published in the American Journal of Science was among the first, if not the very first that reached the East, which was regarded as establishing the fact of the discovery beyond question.

In 1850 he returned to New Haven and then settled in his permanent home. He devoted himself largely to scientific study, and in 1859 was appointed Professor of Industrial Mechanics and Physics at the Scientific School, then in its infancy still. To the growth and prosperity of this institution he devoted himself with unflinching fidelity for the rest of his life. With the increase of numbers it was found necessary to relieve him of a portion of his duties, and in 1872 the title of his chair was changed to Astronomy and Physics. The duties of these two departments he continued to discharge until 1884. In that year in consequence of his impaired health he gave up the professorship of Physics, a new chair having been created for that department. He continued, however, to give instruction in Astronomy until 1886, when he was obliged to abandon teaching entirely. In 1889 he was made Emeritus Professor, and in the following year he died, having lived a few days beyond his seventy-sixth birthday.

Professor Lyman was an almost marvellously expert mechanician and invented several pieces of apparatus now widely used by teachers in science. In addition to his scientific attainments he was of a remarkably sweet and gentle nature, and it has been rarely the case that anyone has been so generally beloved both by those who were under his instruction and those who were brought into contact with him in any other capacity.

Public Lectures.

During the past two years the regular annual courses of lectures to mechanics and others have been given in the lecture room in North Sheffield Hall. The names of the lecturers and the subjects of the lectures were as follows :

Twenty-Third Annual Course, 1889.

I.	Friday,	Feb. 22.—The Great Basin.	Prof. Brewer.
II.	Tuesday,	" 26.—Oaks.	Prof. Daniel C. Eaton.
III.	Friday,	Mar. 1.—Petroleum and Natural Gas.	Prof. J. S. Newberry.
IV.	Tuesday,	" 5.—Chemical Analysis.	Prof. Wells.
V.	Friday,	" 8.—Prison Reform.	Prof. F. Wayland.
VI.	Tuesday,	" 12.—Science and Immortality.	Prof. DuBois.
VII.	Friday,	" 15.—Fast Trains.	Prof. Hadley.
VIII.	Tuesday,	" 19.—New England Town Government.	Mr. Henry C. White.
IX.	Friday,	" 22.—The Laborer and his Employer.	President F. A. Walker.
X.	Tuesday,	" 26.—The Scientific Study of Infant Intelligence.	Mr. Henry T. Blake.
XI.	Friday,	" 29.—The Worship of Meteorites.	Prof. Newton.
XII.	Tuesday,	Apr. 2.—The Antiquity of Man.	Prof. A. E. Verrill.

Twenty-Fourth Annual Course, 1890.

I.	Friday,	Feb. 14.—About Fiction and Other Things.	Mr. Charles Dudley Warner.
II.	Tuesday,	" 18.—The Acquisition of Oregon.	Prof. Brewer.
III.	Friday,	" 21.—The Mystery of Egypt.	Prof. C. A. L. Totten.
IV.	Tuesday,	" 25.—Water Lilies.	Prof. Daniel C. Eaton.
V.	Friday,	" 28.—The London Earthquake of 1750.	Prof. Lounsbury.
VI.	Tuesday,	Mar. 4.—Pools and Trusts.	Prof. Hadley.
VII.	Friday,	" 7.—Recent Researches on the Brain.	Prof. H. H. Donaldson.
VIII.	Tuesday	" 11.—History of the Discovery and Decipherment of the Cuneiform Inscriptions.	Dr. Robert F. Harper.
IX.	Friday,	" 14.—House Sanitation,	Mr. Albert L. Webster.
X.	Tuesday,	" 18.—The Evolution of the French Château.	Prof. D. Cady Eaton.
XI.	Friday,	" 21.—The Amateur Photographer.	Prof. Farnam.
XII.	Tuesday,	" 25.—The French Exhibition of 1889.	Prof. Hastings.

States Represented in the School.

The following table shows the States and Countries from which come the students whose names have appeared on the catalogue during the two years past, and the proportion of numbers that belong to each. The first table gives the numbers for the Academic year, 1889–90.

	Graduates.	Seniors.	Juniors.	Freshmen.	Special.	Total.
California	--	1	3	3	--	7
Colorado	--	--	1	4	--	5
Connecticut	9	32	36	39	4	120
Delaware	--	1	--	1	--	2
Georgia	--	--	--	2	--	2
Illinois	1	4	9	11	2	27
Indiana	--	--	4	3	--	7
Kansas	--	--	1	--	--	1
Kentucky	--	2	1	--	--	3
Louisiana	1	--	--	--	--	1
Maine	1	--	2	--	--	3
Maryland	--	--	1	1	--	2
Massachusetts	1	--	2	6	--	9
Michigan	1	--	1	1	--	3
Minnesota	--	--	1	3	--	4
Missouri	--	2	1	1	--	4
Nebraska	--	--	4	1	--	5
New Jersey	1	1	1	5	--	8
New York	3	13	24	28	1	69
Ohio	1	5	9	2	--	17
Pennsylvania	3	2	4	15	--	24
Rhode Island	--	3	2	--	--	5
Tennessee	--	--	1	--	--	1
Vermont	--	--	--	2	--	2
Washington	--	1	--	--	--	1
Wisconsin	--	1	1	--	--	2
District of Columbia	--	--	1	--	--	1
New Mexico	--	--	--	1	--	1
Canada	--	1	--	1	--	2
England	--	--	--	1	--	1
Japan	--	--	1	--	--	1
Sandwich Islands	1	--	--	1	--	2
Turkey	1	--	--	--	--	1
Total	24	69	111	132	7	343

The following is the table for the present Academic year, 1890–91.

	Graduates.	Seniors.	Juniors.	Freshmen.	Special.	Total,
Alabama	--	--	--	1	--	1
California	1	3	2	5	--	11
Colorado	--	1	4	1	--	6
Connecticut	13	28	32	42	1	118
Delaware	--	--	1	3	--	4
Georgia	--	--	2	2	--	4
Illinois	1	4	13	10	2	30
Indiana	--	3	2	2	--	7
Kansas	--	1	--	--	--	1
Kentucky	--	--	--	1	--	1
Louisiana	1	--	--	1	--	2
Maine	1	2	--	--	--	3
Maryland	--	1	--	1	--	2
Massachssetts	2	2	5	3	--	12
Michigan	--	--	1	5	--	6
Minnesota	--	1	1	5	--	7
Missouri	--	1	1	7	--	9
Nebraska	--	4	1	1	--	6
New Jersey	1	1	3	2	--	7
New York	2	22	29	21	1	75
Ohio	1	8	1	10	1	21
Oregon	--	--	--	1	--	1
Pennsylvania	1	3	13	9	--	26
Rhode Island	1	1	--	--	--	2
Tennessee	--	1	1	--	--	2
Vermont	--	--	2	--	--	2
West Virginia	1	--	--	--	--	1
Wisconsin	--	1	--	--	1	2
Arizona	--	--	--	1	--	1
District of Columbia	--	1	--	1	--	2
New Mexico	--	--	1	--	--	2
Canada	--	--	1	1	--	2
England	--	--	1	--	--	1
Japan	--	1	--	--	--	1
Sandwich Islands	1	--	1	--	--	2
Turkey	1	--	--	--	--	1
Total	30	90	118	136	5	381

Anniversaries.

In the following schedules are given the names of the candidates for degrees in the years 1889 and 1890. The subjects of the graduation theses are also published. The names in the first lists of the Bachelors of Philosophy in each year are of those who stood highest in their respective courses. Those marked with an asterisk read theses in the evening.

The exercises of the Graduating Class of 1889 were held in North Sheffield Hall on the evening of Tuesday, June 24. The names of the candidates are here given, as well as the list of prizes announced at that Anniversary.

Bachelors of Philosophy (70).

Arthur Chambers Alexander (Mechanical Engineering), *Honolulu, H. I.* On Tangent Galvanometers.

James Bradshaw Bailey (Mechanical Engineering), *Harrisburgh, Pa.* On Crank Motion.

*Frank Arthur Busse (Mechanical Engineering), *New Haven.* On Liquid Fuel.

Perry Moore Caldwell (Chemistry), *Wheeling, W. Va.* On the Isomorphism of Zinc and Irod in Sphalerite.

*Frederick Howard Ellsworth (Civil Engineering), *Hartford, Conn.* On the Construction of Permanent Way.

Harootum Enfiajian (Select), *Harpoot, Turkey.* On the Theories of the Source of Solar Heat.

Henry Pierce Hall (Mechanical Engineering), *San Francisco, Cal.* On the Zalinski Pneumatic Dynamite Torpedo Gun.

John Augustus Hartwell (Biology), *Unionville, N. Y.* On the Relative Formation of Albumoses and Peptone in Gastric Digestion.

*Leland Howard (Mechanical Engineering), *Hartford, Conn.* On Coal Breakers.

David Lyman (Mechanical Engineering), *Middlefield.* On the Manufacture of Paper.

*Kingsley Walton Martin (Biology), *Staten Island, N. Y.* On the Achroodextrin of Salivary Digestion.

William Brewster Morrison (Mechanical Engineering), *Willimantic.* On the Theory of Trajectories.

*William Belknap Newberry (Chemistry), *New Haven.* On Sandmeyer's Method.

Frank Lee Owen (Mechanical Engineering), *Oakland, Cal.* On Coast Defense by Submarine Attack.

Kenyon Vickers Painter (Civil Engineering), *Cleveland, O.* On the Water Supply of Cleveland, O.

*Irwin Rew (Select), *Chicago, Ill.* On the History and Development of Gas Works.

CHARLES EMERSON STONE (Select), *Spencer, Mass.* On the Art of Lithography.

*HARRY MIGHELS VERRILL (Select), *Portland, Me.* On the Jesuits in North America.

GUTHRIE MINOR WILSON (Select), *Bardstown, Ky.* On the Sugar Bounties Convention.

WILLIAM BELKNAP ALLEN (Civil Engineering), *Pewee Valley, Ky.* On the Hoosac Tunnel, with the Methods of Excavation used in its Construction.

LOUIS LAWRENCE BARNUM, LL.B. (Select), *Thompsonville.* On the Industrial Remuneration Conference of 1885.

WILLIAM BARTLETT BECKLEY (Mechanical Engineering), *New Haven.* On Hydraulic Dredging.

WILLIAM DENNISON BREED (Mechanical Engineering), *Cincinnati, O.* On Ice Machines.

WILLIAM FRANCIS BREEZE (Mechanical Engineering), *San Francisco, Cal.* On the Manufacture of Steel.

GEORGE TYLER BURROUGHS, JR. (Mechanical Engineering), *Chicago, Ill.* On a Comparison of English and American Locomotives.

HENRY STUDLEY BURROUGHS (Civil Engineering), *Chicago, Ill.* On the Comparison and Designing of Iron Plate Railway Girders.

ARTHUR SANFORD CHENEY (Biology), *New Haven.* On the Structure and Function of the Kidney.

WILLIAM SHINN CLAWSON (Select), *Woodstown, N. J.* On Coal-Tar and its Products.

WILLIAM HILLARD CONYNGHAM (Select), *Wilkesbarre, Pa.* On the Preparation of Anthracite Coal for Market.

FRANK MARCUS COOPER (Civil Engineering), *Kingston, Pa.* On the Design and Construction of High Masonry Dams.

LOUIS JULIUS CURTIS (Select), *Stamford.* On the Distribution of the Surplus.

ARTHUR HERBERT DAY (Chemistry), *New Haven.* On the Separation of Columbic and Tantalic Acids.

EDWARD HANGARY DAY (Select), *New Albany, Ind.* On Penny Postage.

EDWIN KIRK DILLINGHAM (Civil Engineering), *New Orleans, La.* On Railroad Track, its Maintenance and Repair.

LOUIS COERT DUBOIS (Civil Engineering), *Hudson, N. Y.* On the Construction of the Jetties at the Mouth of the Mississippi.

EDWARD EVEREST (Select), *Newark, N. J.* On Flour Milling.

WILLIAM IRVING FERREY (Mechanical Engineering), *Pittsfield, Mass.* On the Maxim Automatic Machine Gun.

THERON ROCKWELL FIELD (Civil Engineering), *New York City.* On the Economic Relations of Grade and Curvature in Railroad Location.

GEORGE FRANK GOODALE (Civil Engineering), *New Haven.* On the Suez Canal.

LEWIS BROWN GAWTRY (Chemistry), *New York City.* On Dibenzylketon.

LEWIS MONTROSE HAIGHT (Chemistry), *Alameda, Cal.* On Para-amidodiphenylamine.

ALFRED HAND, JR., A.B. (Biology), *Scranton, Pa.* On Elastoses and Elastin Peptone.

ARTHUR GRANT HUNTINGTON (Civil Engineering), *Cleveland, O.* On Tunnel Construction.

ARTHUR WISWELL JEPSON (Mechanical Engineering), *New Haven.* On the Hydraulic Transmission of Power.

JOHN HENRY KLOCK, JR. (Chemistry), *New Haven.* On the Precipitation of Copper with Sodium Thiosulphate.

GEORGE ALFRED LUND (Civil Engineering), *West Stratford.* On the Theory and Practice of Railroad Location.

BOYNTON WELLS MCFARLAND (Civil Engineering), *New Haven.* On the Proposed Nicaragua Canal, with Estimate of Cost.

FERRIS JACOBS MEIGS (Select), *New York City.* On the Timber Supply of the United States with Special Reference to the Lumber Interest.

GEORGE WELLINGTON MILES, JR. (Chemistry), *Milford.* On Chrysoidine.

JOHN RAYMOND MITCHELL (Civil Engineering), *Franklin, Pa.* On the Stability of Retaining Walls, with Comparison of Different Methods of Calculation.

AUGUSTUS RENÉ MOËN (Select), *New York City.* On the Orange Societies of Ireland.

EDWIN MORRISON (Mechanical Engineering), *Cincinnati, O.* On an Electric Plant for Yale University.

ROGER SAMUEL NEWELL (Civil Engineering), *Bristol.* On the Determination of the Economic Dimensions of Iron Railroad Bridges.

WILLIAM HENRY PIERCE (Mechanical Engineering), *South Britain.* On the Theory and Construction of Turbines.

EDWIN REED (Select), *Brooklyn, N. Y.* On the Exhaustion of Coal.

HENRY WORK RIANHARD (Select), *New York City.* On the Fast Mail Train Service.

PAUL SKIFF ROBINSON (Biology), *New Haven.* On the Micro-Organic Life of Water and Ice in its Relation to Disease.

PAUL SHEAFER (Mechanical Engineering), *Pottsville, Pa.* On Pneumatic Tubes.

ARTHUR BERTRAM SKELDING (Mechanical Engineering), *Riverside.* On Electric Street Railways.

FRED PALMER SOLLY, A.B. (Biology), *Orange, N. J.* On the Products formed by the Gastric and Pancreatic Digestion of Gelatin.

LEWIS HOBART SWEETZER (Mechanical Engineering), *San Francisco, Cal.* On the Cable Railway Systems of San Francisco.

HENRY HUTCHINS SYKES (Mechanical Engineering), *New Haven.* On Electric Conduits and Subways.

OREN EDWARD TAFT (Mechanical Engineering), *Chicago, Ill.* On the Naphtha-Gas Motor.

ABRAHAM LOUIS THALHEIMER (Mechanical Engineering), *New Haven.* On Hot Air Engines.

CHARLES NEWMAN TRAVER (Mechanical Engineering), *Hudson, N. Y.* On the Water Supply of Hudson, N. Y.

CLARENCE BEECHER TWICHELL (Mechanical Engineering), *New Haven.* On Compressed Air Motors for Street Cars.

BROWNLEE ROBERTSON WARD, A.B. (Biology), *New Haven.* On Myosin Peptone.

ROBERT TAYLOR WHEELER (Biology), *Jersey City, N. J.* On the Influence of Baking Powder Residues on Gastric Digestion.

JULIAN VALLETTE WRIGHT (Mechanical Engineering), *Cincinnati, O.* On Hydraulic Mining.

WILLIAM CHARLES WURTENBERG (Biology), *Willink, N. Y.* On the Influence of the Floating Matter of the Air upon Putrefaction and Infection.

PRIZES.

CLASS OF 1889.

The Belknap Natural History Prize—CHARLES E. STONE, with honorable mention of JOHN A. HARTWELL, WILLIAM B. NEWBERRY, and GUTHRIE M. WILSON.

For excellence in Civil Engineering—FREDERICK H. ELLSWORTH.

For excellence in Mechanical Engineering, the prize divided between FRANK A. BUSSE and WILLIAM B. MORRISON.

CLASS OF 1890.

For excellence in all the Mathematics of the Junior Year—FRANK R. RICH.

For excellence in German—FRANK R. RICH, with honorable mention of ALEXANDER W. EVANS, both having shown exceptional excellence.

CLASS OF 1891.

For excellence in all the Studies of Freshman Year, the prize divided between NOYES D. CLARK and GEORGE P. STARKWEATHER, with honorable mention of DE LANCY A. CAMERON, THEODORE C. JANEWAY, and EDWARD O. SUTTON.

For excellence in Chemistry, the prize divided between BURTON D. BLAIR, ARTHUR E. BOOTH, DE LANCY A. CAMERON, THEODORE C. JANEWAY, and GEORGE P. STARKWEATHER.

For excellence in Physics, the prize divided between NOYES D. CLARK and THEODORE C. JANEWAY, with honorable mention of DAVID L. HUNTINGTON and GEORGE P. STARKWEATHER.

For excellence in Mathematics, the prize divided between DE LANCY A. CAMERON, NOYES D. CLARK, and GEORGE P. STARKWEATHER, with honorable mention of CLIFFORD W. LEAVENWORTH.

For excellence in German—EDWARD O. SUTTON.

For excellence in Mechanical Drawing—CHARLES H. SAUNDERS.

The Exercises of the Graduating Class of 1890 were held in North Sheffield Hall in the evening of Monday, June 23d. The following is the list of the candidates for degrees, and of the prizes that were announced on that occasion.

Civil Engineers (2).

Frank Elwood Brown, Ph.B., *Redlands, San Bernardino Co., Cal.* Original Design for the Bear Valley Arched Dam.

Morgan Walcott, Ph.B., *New York City.* The Designing of Iron and Steel Railway Bridges.

Mechanical Engineer (1).

James Alward Seymour, Ph.B., *Auburn, N. Y.* A Design for a Compound High Speed Steam Engine.

Bachelors of Philosophy (64).

William Lucius Armstrong, B.A. (Biology), *Chicago, Ill.* On the Digestion of Living Tissue.

George Perkins Bissell, Jr. (Mechanical Engineering), *Wilmington, Del.* On Turreted War Ships.

*Theodore Whitney Blake (Mechanical Engineering), *Whitneyville.* On an Investigation of the Electrical Properties of Certain Alloys.

Wendell Phillips Brown (Civil Engineering), *Plainfield.* On Bridge and Pier Foundations.

John Platt Cheney (Chemistry), *South Manchester, Conn.* On the Separation of Arsenic, Tin and Antimony.

*Ralph Roger Clapp (Chemistry), *Pawtucket, R. I.* On the Structure of the Sodium and Silver Salts of Form-ortho-toluide.

Harry Goodyear Day (Select), *Seymour.* On the Nicaragua Canal.

*Walter Dodge (Biology), *Stamford.* On the Histology of the Mucous Membrane of the Stomach of the Cat.

*Harrison Irwin Drummond (Select), *St. Louis, Mo.* On Tobacco as a Commercial Product of the United States.

Julian DuBois (Mechanical Engineering), *Hudson, N. Y.* On Steam Fire Engines.

*Alexander William Evans (Biology), *New Haven.* On the Classification of the Hepaticæ.

Ralph Schuyler Goodwin, Jr. (Biology), *Thomaston.* On Myosine Peptone.

Neil Gray, Jr. (Mechanical Engineering), *Oswego, N. Y.* On Link Motions.

*Everett Gallup Griggs (Select), *Tacoma, Wash.* On the Lumber Production and Lumber Supply of the Pacific Slope.

*Charles Newton Gunn (Civil Engineering), *New Haven.* On Rapid Transit in New York City.

Charles Louis Kirschner (Mechanical Engineering), *New Haven.* On Torpedo Boats.

*Harvey Merrill Lawson (Agriculture), *Union.* On the History of the Turnip, and its Place in British Agriculture.

Franklin Lyman Lawton (Biology), *Meriden.* On the Glycogenic Function of the Liver.

Oliver Smith Lyford, Jr. (Mechanical Engineering), *Chicago, Ill.* On the Dynamo: a History.

John Carter Machale (Mechanical Engineering), *Sawyer City, Pa.* On Deep Well Boring.

*William Crosby Marshall (Mechanical Engineering), *Cromwell.* On High Speed Steam Engines.

Alfred Walling Ogden (Chemistry), *Keyport, N. J.* On the Basic Salts of Zinc.

Robert Ellsworth Peck (Biology), *New Haven.* On the Histology of the Small Intestine of the Cat.

John Frederick Pennell (Civil Engineering), *New Haven.* On the Separate and Combined Systems of Sewerage.

*Frank Russell Rich (Civil Engineering), *New Haven.* On Grade and Curvature and their Effect on Railway Traffic.

Charles Talbot Richmond (Mechanical Engineering), *Providence, R. I.* On the Grinell Automatic Sprinkler.

Ernest Elisha Severy (Select), *Waterbury.* On the Italian Sonnet in English.

Chester Burdell Shepard (Civil Engineering), *Middletown.* On Topographical Surveying.

Albert Milford Turner (Civil Engineering), *Northfield.* On Uniform Live Loads with Locomotive Excess, versus Concentrated Wheel Loads in the Designing of Railway Bridges.

*Henry Lord Wheeler (Chemistry), *Chicago, Ill.* On the Structure of the Sodium and Silver Salts of Formyl-*a*-naphthylamine.

Philip Allen (Civil Engineering), *Providence, R. I.* On Different Methods of Calculating Bridge Strains.

Cyrus Morgan Arnold (Civil Engineering), *New York City.* On the Forth Bridge.

Horace Ray Burritt (Mechanical Engineering), *New Haven.* On Refrigerating and Ice-making Machinery.

William Harper Butler (Mechanical Engineering), *Olean, N. Y.* On Multiple Expansion Steam Engines.

Robert Lockwood Casement (Chemistry), *Painesville, O.* On the Separation of Selenium and Tellurium.

Horace Bushnell Cheney (Mechanical Engineering), *South Manchester.* On Textile Printing.

Clarence Beverly Davison (Civil Engineering), *New York City.* On the Best Process of Making Illuminating Gas.

Nelson Lloyd Deming (Chemistry), *Danbury.* On the Preparation of the Amidines.

Lawrence Heyworth (Select), *Chicago, Ill.* On the Cable Car Systems of the United States.

Theodore Dudley Irwin (Select), *Albany, N. Y.* On the Sea Coast Defence of the United States.

ADRIAN MULLER ISHAM (Civil Engineering), *New York City.* On Railroad Switches.

WALTER TRACY IVES (Mechanical Engineering), *Montreal, Canada.* On the Manufacture of Steel.

WILLIAM FRANCIS JUDSON (Select), *New York City.* On the Competition of the Russian and Indian Wheat Fields with those of the United States.

ELBRIDGE BYRON KEITH (Select), *Chicago, Ill.* On Recent Proposals regarding the Circulation of the National Banks.

WILLIAM MATTHEW KENNA (Biology), *New Haven.* On Bacteria and their Effects.

EUGENE LENTILHON (Civil Engineering), *New York City.* On some Proposed Improvements at the New York Navy Yard.

HERBERT MCBRIDE (Select), *Cleveland, O.* On the Congo Free State and its Commercial Prospects.

FRANK DUNLEVY MCCAULLEY (Select), *New York City.* On the History of Silver since 1878.

HENRY PORTER MCKNIGHT (Civil Engineering), *Louisville, Ky.* On the New Croton Aqueduct of New York City.

FRANK ALOYSIUS MALONEY (Civil Engineering), *New Haven.* On Artificial Water Storage.

FREDERICK JAMES MANN (Biology), *Utica, N Y.* On Fermentation and Putrefaction.

JAMES MOORHEAD MURDOCH (Biology), *Pittsburgh, Pa.* On the Antiseptic Method of Treating Wounds.

PAUL NASH (Civil Engineering), *Westport.* On the Designing of High Masonry Dams.

EDGAR BURR NORTHRUP (Civil Engineering), *Broadalbin, N. Y.* On Retaining Walls.

CHARLES AUGUSTUS OTIS, JR. (Chemistry), *Cleveland, O.* On the Determination of Manganese in the Presence of Calcium.

GAIUS FOSTER PADDOCK (Chemistry), *St. Louis, Mo.* On the Determination of Lead.

JOHN CONOVER POWELL (Civil Engineering), *Dayton, O.* On Steel Rails, their Best Form and Economic Importance.

WILLIAM STERLING ROBY (Select), *Rochester, N. Y.* On the Relations of the Government to the Telegraph Service.

CHARLES FRANCIS ROGERS (Mechanical Engineering), *New Canaan.* On the Corliss Valve Gear.

AMOS LEIVENSPERGER SCHAEFFER, B.A. (Civil Engineering), *Fleetwood, Pa.* On Railroad Accidents.

GEORGE JARVIS SPENCER (Mechanical Engineering), *Old Saybrook.* On an Electric Motor for Street Cars.

WALTER TUTTLE SPENCER (Civil Engineering), *Guilford.* On Foundations.

CHARLES BAILEY SPRUCE (Chemistry), *Kenosha, Wisc.* On the Separation of Manganese and Magnesium.

JOHN CLAYTON TRACY (Civil Engineering), *Fair Haven.* On Preliminary Surveys for Railway Location.

Prizes.

CLASS OF 1890.

For excellence in Civil Engineering, the prize divided between Frank Russell Rich, *New Haven*, and Albert Milford Turner, *Northfield*, with honorable mention of Charles Newton Gunn, *New Haven*.

For excellence in Mechanical Engineering, the prize divided between Charles Louis Kirschner, *New Haven*, and William Crosby Marshall, *Cromwell*.

The Belknap Natural History Prize, awarded to Alexander William Evans, *New Haven*, with honorable mention of Walter Dodge, *Stamford*, and Harvey Merrill Lawson, *Union*.

CLASS OF 1891.

For excellence in Mathematics of Junior Year, the prize awarded to George Pratt Starkweather, *New Haven*, with honorable mention of DeLancey Allen Cameron, *Caledonia, N. Y.*, and Noyes Dwight Clark, *Woodbridge*.

For excellence in German, the prize awarded to George Pratt Starkweather, *New Haven*, with honorable mention of Edward Owen Sutton, *Springfield, Mass.*

CLASS OF 1892.

For excellence in all the Studies of Freshman Year, the prize awarded to Samuel Atkinson Harsh, *Denver, Col.*, with honorable mention of Francis Mullikin Adams, *New Haven*, Sherman Hoyt Bouton, *Chicago, Ill.*, and Claude Gignoux, *Monroe, N. Y.*

For excellence in German, the prize divided between Samuel Atkinson Harsh, *Denver, Col.*, and Claude Gignoux, *Monroe, N. Y.*, with honorable mention of Francis Mullikin Adams, *New Haven*, George Eli Nettleton, *New Haven*, and Paul Sterling, *Bridgeport*.

For excellence in Chemistry, the prize divided between Francis Mullikin Adams, *New Haven*, Claude Gignoux, *Monroe, N. Y.*, Samuel Atkinson Harsh, *Denver, Col.*, and George Eli Nettleton, *New Haven*.

For excellence in Physics, the prize awarded to Bartram Borden Boltwood, *Castleton, N. Y.*, with honorable mention of Samuel Atkinson Harsh, *Denver, Col.*, and Charles Butler Chandler, *Hartford*.

For excellence in Mathematics, the prize awarded to Samuel Atkinson Harsh, *Denver, Col.*, with honorable mention of Francis Mullikin Adams, *New Haven*, Sherman Hoyt Bouton, *Chicago, Ill.*, Claude Gignoux, *Monroe, N. Y.*, and Theophilus Nelson, *Bridgeport*.

For excellence in Mechanical Drawing, the prize awarded to Waldo Clayton Briggs, *New Haven*, with honorable mention of William Atwater Baldwin, *Lahaina, Maui, H. I.*, Samuel Fray, *Bridgeport*, Josiah Harmar, *Philadelphia, Pa.*, and Theophilus Nelson, *Bridgeport*.

PROGRAMME OF STUDIES

AND

CATALOGUE,

FOR THE COLLEGE YEAR, 1890-91.

CALENDAR.

1890.		
25 Sept.,	Thursday,	First Term begins.
17 Dec.,	Wednesday,	First Term ends.
1891.		**Winter Vacation.**
6 Jan.,	Tuesday,	Second Term begins.
25 March,	Wednesday,	Spring Recess begins.
1 April,	Wednesday,	Spring Recess ends.
22 June,	Monday,	Anniversary.
23 June,	Tuesday,	Meeting of Appointing Board.
24 June,	Wednesday,	Commencement.
25 June,	Thursday,	Examinations for Admission begin.
		Summer Vacation.
22 Sept.,	Tuesday,	Examinations for Admission begin.
24 Sept.,	Thursday,	First Term begins.
16 Dec.,	Wednesday,	First Term ends.

ABBREVIATIONS.

S. H.	Sheffield Hall.
N. S. H.	North Sheffield Hall.
B	Sheffield Biological Laboratory
TR.	Treasury Building.
D.	Durfee College.
F.	Farnam College.
E.	East Divinity Hall.
W.	West Divinity Hall.
P. M.	Peabody Museum.
A.	Absent on leave.

In the buildings belonging to the Sheffield Scientific School, the rooms numbered from 1 to 21 are in Sheffield Hall; from 25 to 58 in North Sheffield Hall; from 60 to 79 in the Sheffield Biological Laboratory.

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Oliver Cummings Farrington, M.S. Maine State College, 1888.	*Portland, Me.*	78 B.
Charles Addison Terry, PH.B. Yale University, 1871.	*New Haven, Conn.*	104 Liberty st.
Irving Fisher, B.A. Yale University, 1888.	*New Haven, Conn.*	119 Park st.
Matthew Griswold, Jr., PH.B. Yale University, 1888.	*Erie, Pa.*	A.
Elliott Proctor Joslin, B.A. Yale University, 1890.	*Oxford, Mass.*	1010 Chapel st.
Harvey Merrill Lawson, PH.B. Yale University, 1890.	*Union, Conn.*	56 N. S. H.
Thomas George Lee, M.D. University of Pa., 1886.	*New Haven, Conn.*	373 Crown st.
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Henry Lord Wheeler, PH.B. Yale University, 1890.	*Chicago, Ill.*	126 Wall st.

GRADUATE STUDENTS, 30.

UNDERGRADUATES.

SENIOR CLASS.

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George Fetter Stickney,	*Buffalo, N. Y.*,	1161 Chapel st.
Charles Ferris Sturtevant,	*Cleveland, O.*,	43 College st.
Edward Owen Sutton,	*Springfield, Mass.*,	83 Grove st.

Issa Tanimura,	*Tōkyō, Japan,*	67 Edgewood av.
Amasa Trowbridge,	*New Haven, Conn.,*	685 Orange st.
Edward VanIngen,	*New York City,*	131 Grove st.
Clark Greenwood Voorhees,	*New York City,*	133 College st.
Arvine Wales,	*Massillon, O.,*	131 Grove st.
William Ernest Walker,	*Chicago, Ill.,*	131 Grove st.
Edward Young Ware,	*St. Louis, Mo.,*	9 Library st.
Robert Karl Wehner, Jr.,	*New Haven, Conn.,*	1210 Chapel st.
Rudolph Michael Weyerhaeuser,	*Rock Island, Ill.,*	88 Wall st.
Henry Wick, Jr.,	*Cleveland, O.,*	42 Elm st.
Aras James Williams,	*Utica, N. Y.,*	42 Elm st.
Charles Morgan Wood,	*Dayton, O.,*	131 Grove st.
Pierre Jay Wurts,	*New Haven, Conn.,*	113 Whitney av.

SENIORS, 90.

JUNIOR CLASS.

Francis Mulliken Adams,	*New Haven, Conn.,*	459 Prospect st.
Wallace McKinney Alexander,	*Oakland, Cal.,*	250 York st.
Herbert Burr Atha,	*Newark, N. J.,*	1018 Chapel st.
Fred Murray Ayers,	*Indianapolis, Ind.,*	138 College st.
Walter Stanton Bailey,	*Brooklyn, N. Y.,*	37 Elm st.
William Atwater Baldwin,	*Lahaina, Maui, H. I.,*	250 York st.
Francis Edward Barbour,	*Montreal, Canada,*	226 Crown st.
Frank Harrison Barbour,	*Detroit, Mich.,*	226 Crown st.
Alfred Victor Barnes,	*Brooklyn, N. Y.,*	43 College st.
Joseph Bulkley Barnes,	*New York City,*	124 Wall st.
William Nicholas Beach,	*Orange, N. J.,*	42 Elm st.
Ben Roberts Bechtel,	*West Chester, Pa.,*	126 High st.
Charles Edmund Beeson,	*Uniontown, Pa.,*	131 Grove st.
Bartram Borden Boltwood,	*Castleton, N. Y.,*	137 Wall st.
Sherman Hoyt Bouton,	*Chicago, Ill.,*	92 York sq.
Waldo Clayton Briggs,	*New Haven, Conn.,*	18 Eld st.
William Henry Bronson,	*New York City,*	109 High st.
Harry Kilburn Brown,	*Denver, Col.,*	131 Grove st.
Otis Gridley Bunnell,	*Burlington, Conn.,*	58 Lyon st.
Lucius Lucine Button,	*Norwich, Conn.,*	157 York st.
Walter Lord Caldwell,	*Ongar, Essex, England,*	43 College st.
Robert Calhoun,	*Chicago, Ill.,*	131 Grove st.
George Flavius Campbell,	*Pittsfield, Mass.,*	49 Dixwell av.
Willard Rowe Carrol,	*Yalesville, Conn.,*	Yalesville
Charles Butler Chandler,	*Hartford, Conn.,*	114 High st.
John Charles Clark	*Cincinnati, O.,*	397 Temple st.
Walter Ellsworth Coe,	*Meriden, Conn.,*	60 Grove st.
Wesley Roswell Coe,	*Middlefield, Conn.,*	West Haven
Harry Cone Collins,	*Springfield, Mass.,*	395 Temple st.
Egbert Wheeler Cornwall,	*Patterson, N. Y.,*	397 Crown st.
Wilbur Fisk Day, Jr.,	*New Haven, Conn.,*	310 York st.

Thomas Denny, Jr.,	*New York City*,	130 Wall st.
Duncan Steuart Ellsworth,	*Penn Yan, N. Y.*,	46 College st.
Samuel Fray,	*Bridgeport, Conn.*,	371 Crown st.
Claude Gignoux,	*Monroe, N. Y.*,	285 York st.
Simon Phillip Goodhart,	*New Haven, Conn.*,	221 Crown st.
George Arthur Gordon,	*Savannah, Ga.*,	226 Crown st.
J. Avery Gould,	*Aurora, N. Y.*,	131 Grove st.
Andrew Barbey Graves,	*Brooklyn, N. Y.*,	130 Wall st.
Joseph Sutton Green,	*Raynham, Mass.*,	405 Temple st.
Harry Priest Greene,	*Amsterdam, N. Y.*,	126 High st.
Thomas Strong Griffing,	*Setauket, N. Y.*,	393 Temple st.
David Cullen Griggs,	*Waterbury, Conn.*,	248 York st.
Herbert William Hamlin,	*Chicago, Ill.*,	131 Grove st.
John Henry Hammond, Jr.,	*St. Paul, Minn.*,	43 College st.
Josiah Harmar,	*Philadelphia, Pa.*,	395 Temple st.
Norman Dwight Harris,	*Chicago, Ill.*,	679 Chapel st.
Samuel Atkinson Harsh,	*Denver, Col.*,	131 Howe st.
Frank Lockwood Hatch,	*Springfield, Ill.*,	9 Library st.
Thomas Simmons Homans,	*Springfield, Mass.*,	395 Temple st.
Henry Dwight Hunt,	*Columbia, Conn.*,	81 Wall st.
Gustave Erwin Huttelmaier,	*Knoxville, Tenn.*,	192 Grove st.
Harry Helmer Jackson,	*Chicago, Ill.*,	106 Wall st.
Huson Taylor Jackson,	*Allegheny City, Pa.*,	88 Wall st.
Edward Wilson Johnstone,	*Connellsville, Pa.*,	126 Wall st.
Walter Woodruff Keith,	*Chicago, Ill.*,	131 Grove st.
James Hugh Kimball,	*Chicago, Ill.*,	128 High st.
James Moffatt Knapp,	*Auburn, N. Y.*,	65 w.
Charles Thomas Kountze,	*Omaha, Nebr.*,	86 Wall st.
Henry Edgar Lane,	*Killingworth, Conn.*,	81 Wall st.
William Walter Law, Jr.,	*Yonkers, N. Y.*,	1002 Chapel st.
Joseph Lesinsky,	*New York City*,	393 Temple st.
Isaac Chauncey McKeever,	*New York City*,	226 Crown st.
Edward McVicker,	*Collinsville, N. Y.*,	42 Elm st.
James Stephen Maher,	*New Haven, Conn.*,	203 East st.
Denis James Maloney,	*New Haven, Conn.*,	34 Ferry st.
Frank Edwin Mandel,	*Chicago, Ill.*,	107 Wall st.
Richard Fisher Manning,	*Brooklyn, N. Y.*,	68 Wall st.
Rober Valentine Massey,	*Dover, Del.*,	42 Elm st.
Harold Chauncey Matthews,	*New York City*,	159 Elm st.
Gardner Meeker,	*Newark, N. J.*,	161 York st.
Charles Wilson Merrels,	*New Haven, Conn.*,	24 Pearl st.
Reuben Miller, Jr.,	*Pittsburgh, Pa.*,	7 Library st.
Fred Mold,	*Blosburg, Pa.*,	138 St. John st.
Theophilus Nelson,	*Bridgeport, Conn.*,	371 Crown st.
Edward Sherman Nettleton,	*New Haven, Conn.*,	642 Elm st.
George Eli Nettleton,	*New Haven, Conn.*,	333 Exchange st.
Charles Henry Nichols,	*Branford, Conn.*,	Branford
Louis Septimus Owsley,	*Chicago, Ill.*,	131 Grove st.

Richard Francis Pearce,	*Denver, Col.*,	130 Wall st.
Montague Elias Perkins,	*Bristol, Conn.*,	295 York st.
Roger Swope Pitkin,	*Chicago, Ill.*,	285 York st.
Miles Albion Pond,	*Torrington, Conn.*,	57 Grove st.
John Keeler Punderford,	*New Haven, Conn.*,	75 Howe st.
Harry Ralsten Quinn,	*Milton, Vt.*,	101 Greene st.
Charles Cornwell Ramsdell,	*New Haven, Conn.*,	104 Wall st.
George Wolf Reily, Jr.,	*Harrisburg, Pa.*,	347 York st.
William Reynolds Ricketts,	*Wilkes-Barre, Pa.*,	36 Elm st.
Charles Marcy Robinson,	*Middletown, Conn.*,	305 George st.
Albert B. Rogowski,	*New Haven, Conn.*,	318 Crown st.
Frank Herbert Sampson,	*Boston, Mass.*,	159 Elm st.
William Parker Sargent,	*Chicago, Ill.*,	137 Wall st.
Albert Leslie Sessions,	*Bristol, Conn.*,	248 York st.
Edward Helfenstein Simmons,	*St. Louis, Mo.*,	131 Grove st.
Arthur Jarvis Slade,	*New York City*,	248 York st.
Ralph William Sprague,	*Chicago, Ill.*,	36 Elm st.
Alix Welch Stanley,	*New Britain, Conn.*,	42 Elm st.
Paul Sterling,	*Bridgeport, Conn.*,	152 Grove st.
Harry Taylor Stoddart,	*Wilkes-Barre, Pa.*,	38 Lynwood st.
James Graham Stokes,	*New York City*,	130 Wall st.
Worthington Smith Telford,	*St. Albans, Vt.*,	389 Temple st.
Isaac Biddle Thomas,	*West Chester, Pa.*,	159 Elm st.
Charles Stewart Towle,	*New York City*,	131 Grove st.
John Henry Vought,	*Buffalo, N. Y.*,	131 Grove st.
Percy Talbot Walden,	*Brooklyn, N. Y.*,	86 w.
Walter Frederick Waring,	*Savannah, Ga.*,	131 Grove st.
Lauren Kellogg Warnick,	*Amsterdam, N. Y.*,	248 York st.
Isaac Weil,	*San Francisco, Cal.*,	124 Wall st.
Charles Weiser,	*York, Pa.*,	86 w.
Alfred Pelton Wheeler,	*Meriden, Conn.*,	59 Grove st.
Edward Lancaster Whittemore,	*Fort Union, N. M.*,	213 Wooster st.
Charles Mallory Williams,	*Brooklyn, N. Y.*,	152 Grove st.
Philip Keeney Williams,	*Hartford, Conn.*,	114 High st.
John Baker Winstandley,	*Bedford, Ind.*,	88 Wall st.
Walter Abbott Wood, Jr.,	*Hoosac Falls, N. Y.*,	433 Temple st.
William Bassett Woodward,	*Denver, Col.*,	131 Grove st.
Vincent Jay Youmans,	*Mount Vernon, N. Y.*,	405 Temple st.
Clarence Clark Zantzinger,	*Philadelphia, Pa.*,	38 Elm st.

JUNIORS, 118.

FRESHMAN CLASS.

Roger Cook Adams,	*New Haven, Conn.*,	459 Prospect st.
Frank Alvan Alexander,	*Oakland, Cal.*,	154 Grove st.
Harris Platt Allen,	*New York City*,	136 Howe st.
William Bradford Allen,	*New Haven, Conn.*,	284 Orange st.
Mortimer Harmount Alling,	*New Haven, Conn.*,	238 Orchard st.
William Marvin Armstrong,	*Brooklyn, N. Y.*,	126 Wall st.
James Howard Bailey,	*Brooklyn, N. Y.*,	126 Wall st.
Anson Baldwin,	*Yonkers, N. Y.*,	389 Temple st.
Joseph Henry Bamberg,	*New Haven, Conn.*,	75 Nichol st.
Donn Barber,	*New York City*,	393 Temple st.
Morris Hugus Beall,	*Omaha, Nebr.*,	114 High st.
James Beach Beckett,	*Western Springs, Ill.*,	411 Temple st.
Charles Pool Belden,	*Chicago, Ill.*,	289 York st.
William Bart Berger,	*Denver, Col.*,	90 Wall st.
Walter Spencer Billard,	*Meriden, Conn.*,	61 Grove st.
Oliver Chandler Billings,	*New York City*,	133 College st.
Orland Rossini Blair,	*New Britain, Conn.*,	59 Grove st.
Robert Sylvester Blakeman,	*Stratford, Conn.*,	146 College st.
Lawrence Thornton Bliss,	*New York City*,	132 Wall st.
Harry Lattimer Bloodgood,	*New York City*,	242 York st.
John Merrill Boden,	*Bradford, Pa.*,	1076 Chapel st.
Almon Farrel Bowen,	*Waterbury, Conn.*,	65 Grove st.
Joseph Judson Brooks, Jr.,	*Pittsburgh, Pa.*,	391 Temple st.
Walter Frank Brown,	*New London, Conn.*,	226 Crown st.
Nelson Beardsley Burr,	*Auburn, N. Y.*,	132 Wall st.
Alexander James Campbell,	*San Francisco, Cal.*	65 Grove st.
James Edward F. Campbell,	*New York City*,	114 High st.
Sheldon Cary,	*Cleveland, O.*,	1010 Chapel st.
John Davenport Cheney,	*So. Manchester, Conn.*,	226 Crown st.
George Clifford Clark,	*Terryville, Conn.*,	22 Lynwood st.
Herman Daggett Clark, Jr.,	*New Haven, Conn.*,	13 Trumbull st.
John Williams Coe,	*Meriden, Conn.*,	60 Grove st.
William Garrard Comly,	*Indianapolis, Ind.*,	141 High st.
Henry Failing Conner,	*Portland, Oregon*,	146 College st.
Lester Wiggins Day,	*Louisville, Ky.*,	407 Temple st.
Hughes Dayton,	*Southport, Conn.*,	84 Wall st.
James Laird deVou,	*Wilmington, Del.*,	133 College st.
James Dudley Dewell, Jr.,	*New Haven, Conn.*,	400 Orange st.
Fredrick Wead Drury, Jr.,	*St. Louis, Mo.*,	425 Temple st.
Leroy Church Dupee,	*Chicago, Ill.*,	67 Whalley av.
Ernest Bradford Ellsworth,	*Hartford, Conn.*,	397 Temple st.
Albert DeWolf Erskine,	*Chicago, Ill.*,	407 Temple st.
Jason Evans,	*Morristown, N. J.*,	395 Temple st.
Mark Ewing,	*St. Louis, Mo.*,	124 Wall st.
Joseph Brooks Fair,	*Chicago, Ill.*,	40 Elm st.
Smith Farley Ferguson,	*Troy, N. Y.*,	335 Orange st.

Howard Judson Fish,	*Pasadena, Cal.,*	19 Wall st.
Marc Milton Fishel,	*New York City,*	114 High st.
James Henry Follis,	*San Francisco, Cal.,*	159 Elm st.
Frederick Luther Ford,	*North Branford, Conn.,*	313 Grand av.
George Congdon Fouse,	*Washington, D. C.,*	8 Trumbull st.
Edward Levi Fox,	*New Haven, Conn.,*	117 Park st.
Arthur Graham Freeland,	*New York City,*	150 Grove st.
Richard Garlick,	*Youngstown, O.,*	109 Elm st.
Albert Dewitt Gibbs,	*Chicago, Ill.,*	31 Trumbull st.
Harry Smythe Gordon,	*Cleveland, O.,*	1010 Chapel st.
Gaston Gunter,	*Montgomery, Ala.,*	314 York st.
Robert Ezra Hall,	*Hartford, Conn.,*	124 Wall st.
Samuel Mowbry Hammond, Jr.,	*Torrington, Conn.,*	382 George st.
Thomas King Hanna, Jr.,	*Kansas City, Mo.,*	389 Temple st.
Howard Joseph Haslehurst,	*Brooklyn, N. Y.,*	86 Wall st.
Arthur Stephen Hawley,	*New Haven, Conn.,*	20 Gill st.
Charles Borland Hill,	*Montgomery, N. Y.,*	409 Temple st.
Louis Warren Hill,	*St. Paul, Minn.,*	1076 Chapel st.
Frank Elijah Hine,	*Milford, Conn.,*	55 Trumbull st.
Charles Wilcox Hitchcock,	*Cleveland, O.,*	233 York st.
Sidney Stone Holt,	*New Haven, Conn.,*	71 Dwight st.
William Thomas Hildrup Howe,	*Cazenovia, N. Y.,*	215 Norton st.
Hampton Howell,	*Brooklyn, N. Y.,*	86 Wall st.
Phelps Buttolph Hoyt,	*Chicago, Ill.,*	391 Temple st.
William Churchill Hungerford,	*New Britain, Conn.,*	38 Elm st.
George Albert Hutchinson,	*Chicago, Ill.,*	136 College st.
Charles Anthony Ingersoll,	*New Haven, Conn.,*	24 Elm st.
Harry Churchill January,	*St. Louis, Mo.,*	395 Temple st.
William Rankin Johnston,	*Shippensburg, Pa.,*	228 Crown st.
Thomas O'Conor Jones,	*Pittsburgh, Pa.,*	132 Wall st.
Charles Oscar Kalman,	*St. Paul, Minn.,*	124 Wall st.
John Hume Kedzie, Jr.,	*Evanston, Ill.,*	40 Elm st.
William Lansing, Jr.,	*Albany, N. Y.,*	335 Orange st.
Elmer Arthur Lawbaugh,	*Opechee, Mich.,*	255 Crown st.
Burton Leonard Lawton,	*Meriden, Conn.,*	Meriden.
Louis Cicero Lawton,	*Brooklyn, Conn.,*	55 Prospect st.
Joseph Lentilhon, Jr.,	*New York City,*	391 Temple st.
Harry Blakeman Lewis,	*New Haven, Conn.,*	438 George st.
Frank Allen Little,	*Meriden, Conn.,*	Meriden.
Samuel Whiter McCaulley,	*Wilmington, Del.,*	397 Temple st.
Vance Criswell McCormick,	*Harrisburg, Pa.,*	133 College st.
Clifford Whiting McGee,	*Plainfield, N. J.,*	146 College st.
William McKell,	*Chillicothe, O.,*	1010 Chapel st.
Charles Eugene McLane,	*Baltimore, Md.,*	109 Wall st.
Fred Bogart McMullen,	*Picton, Ontario, Can.,*	419 Temple st.
Herbert Yarwood McMullen,	*Picton, Ontario, Can.,*	419 Temple st.
Winslow Mallery,	*Cincinnati, O.,*	395 Temple st.
Leonard Mandel,	*Chicago, Ill.,*	137 College st.

Edward Anthony Mitchell,	*New Haven, Conn.*,	79 Trumbull st.
Lysander Royster Moore, Jr.,	*Kansas City, Mo.*,	389 Temple st.
Henry Hotchkiss Murray,	*Viola, Del.*,	54 Garden st.
Oliver Peter Nicola,	*Cleveland, O.*,	132 Wall st.
Fred Henry Osborne,	*New Haven, Conn.*,	223 Bradley st.
Samuel Cupples Pierce,	*St. Louis, Mo.*,	395 Temple st.
Edward Harrison Post,	*Wilkes-Barre, Pa.*,	36 Elm st.
Herbert Leroy Potter,	*North Guilford, Conn.*,	15 Rose st.
Joseph Hyde Pratt,	*West Hartford, Conn.*,	397 Temple st.
Wiley Byrd Raymond,	*Wyoming, O.*,	391 Temple st.
Harry Parks Ritchie,	*St. Paul, Minn.*,	114 High st.
Allan Appleton Robbins,	*New York City*,	109 Wall st.
Ralph Stewart Robinson,	*Colchester, Conn.*,	255 Ferry st.
Samuel Moorhead Russell,	*Bedford Springs, Pa.*,	120 High st.
Alexander Kirkwood Sedgwick,	*Ishpeming, Mich.*,	1090 Chapel st.
George Bargh Sedgwick,	*Ishpeming, Mich.*,	1090 Chapel st.
DeForest Lee Selover,	*Cleveland, O.*,	55 Trumbull st.
Edward Olin Smith,	*Springfield, Mass.*,	109 Elm st.
Lewis Motter Smith,	*St. Joseph, Mo.*,	126 Wall st.
Frederick Clarence Spencer,	*Old Saybrook, Conn.*,	411 Temple st.
Alfred Hull Stevens,	*Clinton, Conn.*,	117 Park st.
William Petheric Stevens,	*Detroit, Mich.*,	425 Temple st.
Raymond French Stoddard,	*Milford, Conn.*,	Milford.
Charles Bradley Stoughton, Jr.,	*New Haven, Conn.*,	339 Prospect st.
Frederick Enos Stow,	*Plantsville, Conn.*,	70 Howe st.
Richard Pearson Strong,	*Atlanta, Ga.*,	200 Grove st.
Henry Augustus Stults,	*Savannah, Ga.*,	409 Temple st.
Richard Schoonmaker Suydam,	*Allegheny City, Pa.*,	9 Library st.
Edward Coleman Talcott,	*Hartford, Conn.*,	133 College st.
William Buffum Thompson,	*Pasadena, Cal.*,	19 Wall st.
Walter Henry Tilton,	*New Haven, Conn.*,	235 Dixwell av.
John Stewart Tritle,	*Prescott, Arizona*,	407 Orange st.
Albert Leverett VanHuyck,	*Lee, Mass.*,	17 Home pl.
McLane VanIngen,	*New York City*,	425 Temple st.
Paul Wentworth Webster,	*Cleveland, O.*,	83 Grove st.
Frederick Brown Wells,	*Minneapolis, Minn.*,	158 Whitney av.
Robert William Whitehead,	*Wakefield, Mass.*,	223 York st.
Howard Dudley Wiggins,	*Indianapolis, Ind.*,	141 High st.
Ira Edward Wight,	*New Orleans, La.*,	389 Temple st.
Eugene Robbins Willard,	*Hartford, Conn.*,	146 College st.
Wallace Charles Winter,	*St. Paul, Minn.*,	114 High st.
Ernest Strong Witbeck,	*Detroit, Mich.*,	133 College st.
Harry Philip Womelsdorf,	*Pottsville, Pa.*,	130 Wall st.

FRESHMEN, 137.

SPECIAL STUDENTS NOT CANDIDATES FOR A DEGREE.

John Harry Frambach,	*Kaukauna, Wisc.*,	138 Court st.
James Tracy Hill,	*Chicago, Ill.*,	43 College st.
William Whittemore Low,	*New Haven, Conn.*,	213 Wooster st.
William Herbert Krumm,	*Columbus, O.*	185 Bradley st.
Arthur Stein,	*Chicago, Ill.*,	107 Wall st.
George Curtis Treadwell,	*Albany, N. Y.*,	184 York st.

SPECIAL STUDENTS, 6.

SUMMARY.

Graduates,	29
Seniors,	90
Juniors,	118
Freshmen,	137
Special Students,	6
	381

SHEFFIELD SCIENTIFIC SCHOOL.

OBJECTS.

The Sheffield Scientific School is devoted to instruction and researches in the mathematical, physical and natural sciences, with reference to the promotion and diffusion of science, and also to the preparation of young men for such pursuits as require especial proficiency in these departments of learning. It is one of the Departments of Yale University, like the law, medical, theological, and art schools, having its separate funds, buildings, teachers and regulations, but governed by the Corporation of Yale College, which appoints the professors and confers the degrees. It is, in part, analogous to the academic department, or classical college, and, in part, to the professional schools.

The instruction is intended for two classes of students :—

I. Graduates of this or of other colleges, and other persons qualified for advanced or special scientific study.

II. Undergraduates who desire a training chiefly mathematical and scientific, in less part linguistic and literary, for higher scientific studies, or for various other occupations to which such training is suited.

HISTORY AND ORGANIZATION.

The school was commenced in 1847. In 1860, a convenient building and considerable endowment were given by Joseph E. Sheffield, Esq., of New Haven, whose name at the repeated request of the Corporation of Yale College, was afterwards attached to the foundation. Mr. Sheffield afterward frequently and munificently increased his original gifts.

In 1863, by an act of the Connecticut Legislature, the national grant for the promotion of scientific education (under the congressional enactment of July, 1862), was given to this department of Yale University. Since that time, and especially since the autumn of 1868, numerous liberal gifts have been received from

the citizens of New Haven, and from other gentlemen in Connecticut and New York, for the endowment of the School, and the increase of its collections.

The action of the State led to the designation by law of a State Board of Visitors, consisting of the Governor, Lieutenant-Governor, three senior Senators, and the Secretary of the State Board of Education : and this Board, with the Secretary of the Scientific School, is also the Board for the appointment of students to hold the State scholarships.

The Governing Board consists of the President of Yale University, the Director of the school, and the professors who are permanently attached to it. There are several other instructors associated with them, a number of whom are connected with other departments of the University.

BUILDINGS AND APPARATUS.

The three buildings in which the work of instruction in the Scientific School is mainly carried on, are called Sheffield Hall, North Sheffield Hall, and Sheffield Biological Laboratory ; but instruction in Mineralogy, Geology, and Zoology, is given in the Peabody Museum, and Free Hand Drawing in the Art School. These buildings contain a large number of recitation and lecture rooms, a hall for public assemblies and lectures, chemical, biological, and metallurgical laboratories, besides studies for some of the professors, where their private technical libraries are kept.

The following is a summary statement of the collections belonging to the School :

1. Laboratories and Apparatus in Chemistry, Metallurgy, Physics and Zoology.
2. Metallurgical Museum of Ores, Furnace Products, etc.
3. Agricultural Museum of Soils, Fertilizers, useful and injurious insects, etc.
4. Collections in Zoology.
5. Astronomical Observatory, with an equatorial telescope by Clark and Sons, of Cambridge, a meridian circle, etc.
6. A collection of Mechanical Apparatus, constituting the " Collier Cabinet."
7. Models in Architecture, Geometrical Drawing, Civil Engineering, Topographical Engineering and Mechanics; diagrams adapted to public lectures; instruments for field practice.
8. Maps and Charts, topographical, geological, hydrographical, etc.

The herbarium of Professor Brewer is deposited in the buildings. Professor Eaton's herbarium near at hand, is freely accessible. Students also have access to the various laboratories and collections in Natural Science in the Peabody Museum and in that building is given the instruction in Zoology and Geology.

Students are also admitted to the University and Society libraries, the College Reading Room, the School of the Fine Arts and the Gymnasium.

THE LIBRARY.

The special technical library of the Scientific School consists of about five thousand volumes. Included in this is the "Hillhouse Mathematical Library" of twenty-four hundred volumes, collected during a long series of years by Dr. William Hillhouse, and in 1870 purchased and presented to the institution by Mr. Sheffield. A catalogue of this collection forms a supplement to the Annual Report of the Governing Board of 1870. All the prominent scientific journals of this country and of Europe, together with the proceedings of foreign academies, and scientific societies, can be found either in this library or in the University Library, to which students have access. A Chemical Library is also attached to the Chemical Department in Sheffield Hall.

INSTRUCTION FOR GRADUATE AND SPECIAL STUDENTS.

Persons who have gone through undergraduate courses of study here or elsewhere, may avail themselves of the facilities of the School for more special professional training in the physical sciences and their applications; gaining in one, two, or three years, the degree of Bachelor of Philosophy or, in two additional years of Engineering study, that of Civil Engineer or of Mechanical Engineer.

Or, engaging in studies of a less exclusively technical character, they may become candidates for the degree of Doctor of Philosophy. The instruction in such cases will be adapted to the particular needs and capacities of each student, and may be combined with that given by the graduate instructors in other departments of the University. This degree is conferred upon those who, having already taken a Bachelor's degree, engage as students in the Department of Philosophy and the Arts for not less than two years in assiduous and careful study. It is not given upon examination to those whose studies are pursued elsewhere. The requirements for it will in some cases exact of the

student more than two years of post-graduate labor, especially so, wherever the course of undergraduate study has been, as in the Scientific School, of less than four years. The candidate must pass a satisfactory final examination, and present a thesis giving evidence of high attainment in the branches of knowledge to which he has attended. A good knowledge of Latin, German, and French will be required in all cases, unless, for some exceptional reason, the candidate be excused by the Faculty. The graduating fee is ten dollars.

Subjects likely to receive special attention are suggested as follows :

Professor DuBois, in the principles of thermodynamics, and utilization of heat as a source of power.

Professor Richards, in mechanical engineering.

Professor Hastings, in selected subjects in physics, and guidance in laboratory work.

Professor Brush and Professor S. L. Penfield, in the analysis and determination of mineral species, and in descriptive mineralogy.

Professor Johnson, in theoretical, analytical, and agricultural chemistry.

Professor Brewer, in agriculture and forest culture and in physical geography.

Professor Clark, in definite integrals, differential equations, analytical mechanics, the theory of numerical approximation, with the method of least squares.

Professor Eaton, in structural and systematic botany, with reference to both flowering and cryptogamous plants.

Professor Verrill, and Professor Smith, in zoology, comparative anatomy, and geology.

Professor Chittenden, in Physiological Chemistry and Experimental toxicology.

Professor H. L. Wells and Professor S. L. Penfield, Analytical Chemistry, including a systematic course in Qualitative Analysis ; a systematic course in Quantitative Analysis, and such special branches of Quantitative Analysis as are applied to Mineralogy and various departments of Metallurgy.

Professor S. L. Penfield in Crystallography.

The same courses of study are open, for a longer or shorter time, to graduate students who do not desire to become candidates for a degree.

Students who have taken the degree of Bachelor of Philosophy, may obtain the degree of CIVIL or of MECHANICAL ENGINEER at the end of two academical years, by pursuing the following higher course of study and professional training.

The course of study for the degree of CIVIL ENGINEER will comprise—

1. Higher Calculus, Higher Geometry. Theory of Numerical Operations.
2. Analytical Mechanics. Mechanics applied to engineering.
3. A Course of Constructions and Designs. Projects.
4. Practical Astronomy, with use of instruments, computations, etc.

The course will occupy one year.

To secure the requisite amount of professional knowledge and practice, the candidate will be required to furnish a comprehensive report of the results of an examination into the existing condition of some special line of constructive art; or to present proper evidence that he has had actual charge in the field, for several months, of construction or surveying parties, or held some responsible position deemed equivalent to this.

An elaborate design must also be submitted of some projected work of construction, based upon exact data obtained from careful surveys made by the candidate, and comprising all the requisite calculations and the necessary detailed drawings, and accompanied by full specifications of the work to be done and the requirements to be met by the contractor.

The fee for this degree is five dollars.

The course of study for the degree of MECHANICAL ENGINEER will comprise—

1. Higher Calculus, Higher Geometry. Theory of Numerical Operations.
2. General Principles of Dynamics (Analytical Mechanics), including special application of these Principles to Dynamic Problems.
3. Construction of Machines. Designs.
4. Preparation of theses on special objects in Mechanical Engineering.

During the second year, candidates will be permitted to employ such portion of their time as may be deemed advisable or necessary in the examination of engineering works and manufacturing establishments, and may also have the privilege of entering upon professional practice, provided it is done with the knowledge and consent of the Professor of Mechanical Engineering, and under

such circumstances as shall appear to him to be favorable to professional progress.

An elaborate thesis on some professional subject, with an original design, or project, accompanied by proper working drawings, will be required at the end of the second year.

The fee for this degree is five dollars.

Special Students.—For the benefit of those who, being fully qualified, desire to pursue particular studies without reference to the obtaining of a degree, special or irregular students are received in most of the departments of the School; not, however, in the Select Course or in the Freshman Class.

It should be distinctly understood that these opportunities are not offered to persons who are incompetent to go on with the special studies pursued by the regular classes, but are designed to aid those who, having received a sufficient preliminary education elsewhere, desire to increase their proficiency in special branches.

INSTRUCTION FOR UNDERGRADUATE STUDENTS.

Terms of Admission.—Candidates must be not less than fifteen years of age, and must bring satisfactory testimonials of moral character from their former instructors or other responsible persons.

For admission to the Freshman Class the student must pass a satisfactory examination in the following subjects:

English—including grammar, spelling, and composition. In grammar, Whitney's Essentials of English Grammar, or an equivalent.

History of the United States.

Geography.

Latin—(1) Simple exercises in translating English into Latin, together with the elements of Latin Grammar. (2) Caesar—six books of the Gallic War, or their equivalent. (After September, 1891, there will be substituted for the six Books of Caesar, four books of Caesar's Gallic War and the first two books of Virgil's Aeneid, for which, without special application, no equivalent will be accepted.)

Arithmetic—Fundamental Operations, Least Common Multiple, Greatest Common Divisor, Common and Decimal Fractions, Denominate Numbers, including the Metric System of Weights and Measures; Percentages, including Interest, Discount, and Commission; Proportion, Extraction of the Square and Cube Roots.

Algebra—Fundamental Operations, Fractions, Equations of the First Degree, with one or several unknown quantities; Inequalities, Ratio and Proportion, Powers and Roots, including the theory of Exponents, the Binomial Formula, for an Entire Exponent, and the transformation and Reduction of Radicals;

Equations of the Second Degree, Progressions, Continued Fractions, Permutations and Combinations, the Doctrine of Limits, the Nature of Series, the Method of Indeterminate Coefficients, Fundamental Properties of Logarithms, Compound Interest and Annuties.

Geometry—Plane, Solid and Spherical; including fundamental notions of Symmetry, and examples of Loci and Maxima and Minima of Plane Figures,—so much, for example, as is contained in Newcomb's Geometry, exclusive of the chapters on the Ellipse, Hyperbola, and Parabola.

Trigonometrg—including the Analytical Theory of the Trigonometrical Functions, and the usual formulae; the Construction and Use of Trigonometrical Tables; and the Solution of Plane Triangles:—so much, for example, as is contained in the first six chapters of Newcomb's larger Trigonometry and in Arts. 75–78 of chapter viii, with the explanation of the first five tables in Newcomb's five-figure Logarithmic and Trigonometric Tables, which are furnished at the examination in New Haven.

While no entrance examination is held in the *History of England*, candidates for admission are urgently advised to make themselves as familiar as possible with that subject, as a knowledge of it is essential to the most successful prosecution of some of the studies of the course.

Candidates will be allowed the option of passing on the above-named subjects in two successive years. In such cases they must present themselves for examination at the June examination of the first year in the following subjects or parts of subjects: *History of the United States, Geography, Arithmetic, Plane Geometry, and Algebra to Quadratic Equations.*

In order to have this preliminary examination counted, candidates must pass satisfactorily on four of the subjects; and notice of the intention to divide the examination must be given to Professor George J. Brush, Director of the School, on or before June 15.

In his preparation in GEOMETRY, the candidate should, as far as practicable, have suitable exercises in proving simple theorems and in solving simple problems for himself. It is important, too, that he should be accustomed to the numerical application of geometric principles, and especially to the prompt recollection and use of the elementary formulæ of mensuration. In TRIGONOMETRY he should be exercised in applying the usual formulae to a variety of simple reductions and transformations, including the solution of trigonometrical equations. Readiness and accuracy in trigonometrical calculations are also of prime importance to the candidate. If the use of logarithms is postponed in his preparation till Trigonometry is taken up (which is by no means necessary or advisable), he should then have abundant applications of them to all forms of calculation occurring in ordinary practice, as well as to those appearing in the solution of triangles. Finally, in all his calculations, he should study the art of neat and orderly arrangement.

In LATIN the student should have such continued training in parsing as shall make him thoroughly familiar with declensions and conjugations, and with the

leading principles of syntax. To secure these results more effectually, the requirement has been adopted of simple exercises in translating English into Latin. As this course of exercises is designed solely as a preparation for reading, it should be begun at the earliest stage of Latin study. A very large proportion of the deficiencies in the Latin examinations for several years past has been due to the neglect of the suggestions of this paragraph, and to the attempt to read a Latin author with totally inadequate grammatical preparation.

The examinations for admission in 1891 take place at North Sheffield Hall on Thursday, Friday, and Saturday, June 25, 26, 27 (beginning at 9 A. M. on Thursday); and on Tuesday and Wednesday, September 22, 23 (beginning at 9 A. M. on Tuesday).

In general, examinations for admission to the Freshman Class of the *next* year can be held only in June and September as specified: if in any case sufficient reason exists for an exception to this rule, a special fee (not exceeding fifty dollars) will be charged.

In 1891, examinations (for the Freshman Class only) will also be held in Concord and Exeter, N. H., in Andover, Mass., in Norwich, Conn., in New York City, in Albany, in Buffalo, in Chicago, in Cleveland, in Cincinnati, and in San Francisco (beginning on Thursday, June 25, at 9 A. M.), at places to be announced in local newspapers of the day previous. Candidates who propose to be present are requested to send their names to Professor George J. Brush, Director of the School, before June 15. A fee of five dollars will be charged for admission to the examinations outside of New Haven.

All candidates for advanced standing, *whether from other colleges or not*, are examined in addition to the preparatory studies, in those studies already pursued by the class which they wish to enter. Certificates of standing elsewhere cannot be accepted in place of these examinations, although they may be taken into account as collateral evidence of fitness for admission. No one can be admitted as a candidate for a degree, later than at the beginning of the Senior year.

COURSES OF INSTRUCTION, occupying three years, are arranged to suit the requirements of various classes of students. The first year's work is the same for all; for the last two years, the instruction is chiefly arranged in Special Courses. The Special Courses most distinctly marked out are the following:

(*a.*) In Chemistry; (*b.*) In Civil Engineering;
(*c.*) In Mechanical Engineering;
(*d.*) In Agriculture: (*e.*) In Natural History;
(*f.*) In Biology preparatory to Medical studies;
(*g.*) In studies preparatory to Mining and Metallurgy;
(*h.*) In select studies preparatory to other higher studies.

The arrangement of studies is indicated in the annexed scheme. A fuller statement of the methods and character of the instruction will be found below. Unless otherwise specified, the number of hours given means hours per week.

FRESHMAN YEAR: INTRODUCTORY TO ALL THE COURSES.

FIRST TERM:—*German*—Whitney's Grammar and Reader, 3 hrs. *English*—Lounsbury's History of the English Language, 1 hr.; Exercises in Composition. *Mathematics*—The Derivatives of Algebraic Functions; Fundamental Properties of Equations; Plane Analytical Geometry; 3 hrs. *Physics*—Recitations, 2 hrs., with experimental lectures, 2 hrs. *Chemistry*—Mixter's; Recitations, 2 hrs; laboratory practice, 2 hrs. *Elementary Drawing*—Practical Lessons in the Art School, 3 hrs.

SECOND TERM:—*Language, Physics and Chemistry*—as stated above. *Mathematics*—Plane Analytical Geometry, continued, 3 hrs. *Physical Geography*—8 Lectures during the term. *Botany*—Gray's Lessons, 3 hrs. *Drawing*—Principles of Orthographic Projection; Isometric Drawing with application to drawing from models and structures, and isometric construction of objects from their orthographic projections; Projections of Shadows; Shading and tinting; Sections; Developments and Intersections of Surfaces; 4 hrs.

For the Senior and Junior years, the students select for themselves one of the following Courses:

(a.) IN CHEMISTRY.

JUNIOR YEAR.

FIRST TERM:—*Organic Chemistry*—Lectures and Recitations, 2 hrs. *Qualitative Analysis*—Recitations, 2 hrs.; Laboratory Practice, 20 hrs.; Blowpipe Practice and Determinative Mineralogy, 4 hrs. *German*—3 hrs. *French*—3 hrs.

SECOND TERM:—*Organic Chemistry*—Lectures and Recitations, 2 hrs. *Quantitative Analysis*—Laboratory Practice, 20 hrs.; Recitations, 2 hrs. *Mineralogy*—Blowpipe Analysis and determination of species, 4 hrs.; Lectures in Crystallography and Descriptive Mineralogy, 2 hrs. *German*—3 hrs. *French*—3 hrs.

SENIOR YEAR.

FIRST TERM:—*Organic and Theoretical Chemistry*—Recitations and Lectures, 2 hrs. *Agricultural Chemistry*—Recitations (optional), 2 hrs. *Quantitative Analysis*—continued six weeks, 20 hrs. *Organic Chemistry*—Experimental work

during the remainder of the term, 20 hrs. *Geology*—Dana's; Recitations, 3 hrs. *Zoology*—Lectures, 2 hrs. *French*—3 hrs.

SECOND TERM:—*Theoretical Chemistry*—continued, 2 hrs. *Zoology*—continued 2 hrs. *Agricultural Chemistry*—(optional), 2 hrs. *Analytical Chemistry*—Analysis of Minerals and Technical Products, 20 hrs. *Assaying*—(optional). *Metallurgy*—Lectures (optional). *Geology*—Dana's, 3 hrs. *Mineralogy*—(optional). *French*—3 hrs., during Winter half-term.

The Laboratory Practice of the second term of the Senior year may be devoted to such special branches of Analytical or Organic Chemistry as the student may desire, or to original investigations in connection with theses.

(*b.*) IN CIVIL ENGINEERING:

JUNIOR YEAR.

FIRST TERM:—*Mathematics*—Analytical Geometry of Three Dimensions; Elements of the Theory of Functions; Differential Calculus, with applications to Geometry and Analysis; solution of Numerical Equations; 6 hrs. *Surveying*—Field Work, 16 hrs. till November. *Drawing*—Descriptive Geometry, 6 hrs. from November. *German*—3 hrs. *French*—3 hrs.

SECOND TERM:—*Mathematics*—Integral Calculus with applications to Geometry; Rational Mechanics; 6 hrs. *Drawing*—Descriptive Geometry, concluded; Topographical; Practice in working drawings; 6 hrs. *Surveying*—Topographical and Railroad curves, 16 hrs. *German*—3 hrs. *French*—3 hrs.

SENIOR YEAR.

FIRST TERM:—*Field Engineering*—Location of line of Railroad, setting out slope-stakes, calculation of earthwork; Lectures on economic location; Office work; Henck's Field Book; 20 hrs. till November. *Civil Engineering*—Mechanics applied to Engineering; Resistance of Materials; Bridges and Roofs; Stone cutting with Graphical Problems; 8 hrs. *Geology*—Dana's, 3 hrs. *Mineralogy*—Blowpipe Analysis and Determinative Mineralogy, 8 hrs. *French*—3 hrs.

SECOND TERM:—*Civil Engineering*—Bridges and Roofs; Building Materials; Stability of Arches and Walls; Foundations; 6 hrs. *Dynamics*—Principles of Mechanism; Thermodynamics; Steam Engine; 6 hrs. *Hydraulics*—Hydraulics and Hydraulic Motors, 3 hrs. *Drawing*—Designing; Practical Problems; Specifications and Estimates; 12 hrs. *Spherical Trigonometry and Astronomy*—Practical Astronomy, with field work, 6 hrs. *Geology*—3 hrs. *French*—3 hrs. during Winter half-term.

(*c.*) IN MECHANICAL ENGINEERING.

JUNIOR YEAR:

FIRST TERM—*Mathematics*—Annalytical Geometry of Three Dimensions; Elements of the Theory of Functions; Differential Calculus with applications to Geometry and Analysis; Solution of Numerical Equations; 6 hrs. *Surveying*—Theory and Practice, 3 hrs. until November 1st. *Principles of Mechanism*—

Kinematics, 1 hr. *Shop Visiting*—Study of Machine Details and Tools; 3 hrs., beginning when Surveying ends. *Drawing*—Descriptive Geometry, 3 hrs. *German*—3 hrs. *French*—3 hrs.

SECOND TERM:—*Mathematics*—Integral Calculus with applications to Geometry; Rational Mechanics; 6 hrs. *Principles of Mechanism*—Applied Kinematics; Forms of Teeth of Wheels; Cams; Parallel Motions; Transmission of Power by Belts and Gearing, etc.; 1 hr. until Spring recess, then 2 hrs. *Shop Visiting*—continued, 3 hrs. until Spring recess. *Study of the Steam Engine*—2 hrs. after Spring recess. *Drawing*—Perspective and Shadows; Machine Elements; 3 hrs. *German*—3 hrs. *French*—3 hrs.

SENIOR YEAR:

FIRST TERM:—*Applied Mechanics*—Friction; Moment of Inertia; Centrifugal Force; Elasticity and Strength of Materials; Theory of Flexure and Torsion; Strains in Structures; Construction of Roofs and Bridges; Equilibrium and Pressure of Fluids; Theory of Flotation; Flows of Fluids in Pipes and Channels; Resistance of Ships; 9 hrs. *Machine Designing*—Practical Exercises in Designing Machine Details and Simple Machines, 12 hrs. *Study of the Steam Engine*—continued, 2 hrs. *Electricity*—(optional)—Laboratory work, 3 hrs. *Visits of Inspection*—Examination of Machinery in operation; Reports of Visits. *French*—3 hrs.

SECOND TERM:—*Applied Mechanics*—continued; Hydrodynamics; Theory of Water-Wheels and Turbines; 6 hrs. *Therymodynamics*—3 hrs. *Study of the Steam Boiler*—2 hrs. *Electricity*—(optional)—Laboratory work, 3 hrs.; Lectures, 2 hrs. *Machine Drawing*—continued; advanced exercises in Preparing Designs and Working Drawings for Machinery; Estimates and Weight and Cost of Machinery; 12 hrs. *French*—3 hrs. during Winter half-term. *Thesis. Visits of Inspection and Reports.*

(d.) IN AGRICULTURE:

JUNIOR YEAR:

The course is identical with that in Chemistry, except that in the second term lectures in Crystallography and Descriptive Mineralogy are omitted, and in the Spring half-term Botany is substituted for Determinative Mineralogy.

SENIOR YEAR:

FIRST TERM:—*Agriculture*—Recitations, 2 hrs.; *Agricultural Chemistry*—Recitations, 2 hrs. *Geology*—Recitations, 3 hrs. *Zoology*—Lectures, 2 hrs. *Meterology*—Lectures, 2 hrs. *Botany*—Laboratory Practice, 5 hrs. *French*—Recitations, 3 hrs.

SECOND TERM:—*Agriculture*—Recitations or Lectures, 2 hrs. *Agricultural Chemistry*—Recitations, 2 hrs. *Physiology*—Recitations or Lectures, 2 hrs. *Geology*—Recitations, 3 hrs. *Zoology*—continued, 2 hrs. *Heredity and Stock-Breeding*—Lectures, 2 hrs. during Winter half-term. *Sanitary Science and Public Health*—Lectures, 2 hrs. during Spring half-term. *French*—3 hrs. during Winter half-term.

(e.) IN NATURAL HISTORY.

Either Mineralogy, Zoology, or Botany, may be made the principal laboratory study, some attention in each case being directed to the other branches of Natural History.

JUNIOR YEAR:

FIRST TERM:—*Organic Chemistry*—Lectures and Recitations. *Qualitative Analysis*—Fresenius's; Laboratory Practice; Recitations. *Mineralogy*—Blowpipe Analysis and Determinative Mineralogy, 4 hrs. *Botany*—Gray's Manual, 3 hrs.; Laboratory Practice, 3 hrs. *German*—3 hrs. *French*—3 hrs.

SECOND TERM:—*Zoology*—Laboratory Practice, 6 to 12 hrs.; Recitations; Excursions (land and marine). *Botany*—Lectures; Laboratory Practice in the identification of Phaenogamous Plants, 2 hrs. *Physiology*—Huxley's. *Embryology*—Lectures. *Mineralogy*—Blowpipe Analysis and Determinative Mineralogy, 4 hrs. Lectures in Crystallography and Descriptive Mineralogy, 2 hrs. *Physical Geography*—4 hrs. during Winter half-term. *German*—3 hrs. *French*—3 hrs.

SENIOR YEAR:

FIRST TERM:—*Geology*—Dana's, 3 hrs.; Excursions. *Zoology*—Laboratory Practice, 8 to 12 hrs.; Lectures, 2 hrs.; Recitations, 2 hrs.; Excursions. *Botany*—Laboratory Practice in the Preparation and Examination of Microscopical Specimens, illustrative of Stem-structure and of the Anatomy of the higher Cryptogamous Plants, 5 hrs.; Excursions. *Mineralogy*—Lectures, 2 hrs. *French*—3 hours.

SECOND TERM:—*Geology*—Dana's 3 hrs. *Anatomy of Vertebrates*—Huxley's, 2 hrs. *Zoology*—Laboratory Practice, 8 to 12 hrs.; Recitations, 2 hrs.; Lectures, 2 hrs. *Botany*—Herbarium Studies, especially in the Cryptogamous Orders; Botanical Literature; Essays in Descriptive Botany. *Sanitary Science, Laws of Heredity, and Principles of Breeding*—Lectures. *French*—3 hrs. during the Winter half-term.

Besides the regular course of recitations and lectures on structural and systematic Zoology and Botany, and on special subjects, students are taught in the laboratories to prepare, arrange, and identify collections, to make dissections, to pursue investigations, and when sufficiently advanced, to describe genera and species in the language of science. For these purposes, large collections in Zoology belonging to the University are available, as are also the private botanical collections of Professor Eaton.

(f.) IN BIOLOGY PREPARATORY TO MEDICAL STUDIES.

JUNIOR YEAR:

FIRST TERM:—*Organic Chemistry*—Lectures and Recitations, 2 hrs. *Qualitative Analysis*—Fresenius's; Laboratory Practice, 20 hrs; Recitations, 2 hrs. *Mineralogy*—Blowpipe Analysis and Determinative Mineralogy, 4 hrs. *German*—3 hrs. *French*—3 hrs.

SECOND TERM:—*Comparative Anatomy and Histology* — Laboratory Practice, 18 hrs.; Lectures and Recitations, 1 hr. *Physiology*—Huxley's; Recitations, 2 hrs. *Embryology*—8 Lectures during the term. *Organic Chemistry*—continued, 2 hrs. *Mineralogy*—continued through Winter half-term, 4 hrs. *Botany*—Lectures; Laboratory Practice in the identification of Phaenogamous plants, 5 hrs. during Spring half-term. Excursions. *French*—3 hrs. *German*—3 hrs.

SENIOR YEAR:

FIRST TERM:—*Physiological Chemistry*—Recitations and Lectures, 3 hrs.; Laboratory Practice, 13 hrs. *Organic and Theoretical Chemistry*—Lectures and Recitations, 2 hrs. *Zoology*—Lectures, 2 hrs. *Botany*—Laboratory Practice in the Preparation and Examination of Microscopical Specimens, illustrative of Stem-structure, and of the Anatomy of the higher Cryptogamous Plants, 5 hrs. *Geology*—Dana's, 3 hrs. *French*—3 hrs.

SECOND TERM:—*Physiological Chemistry and Experimental Toxicology*—Illustrative Lectures, Recitations and Laboratory Practice, 27 hrs. *Geology*—Dana's, 3 hrs. *Zoology*—continued, 2 hrs. *Sanitary Science*—Lectures, 2 hrs. during Spring half-term. *Laws of Heredity and Principles of Breeding*—Lectures, 2 hrs. during Winter half-term. *French*—3 hrs. during Winter half-term.

(g.) IN STUDIES PREPARATORY TO MINING AND METALLURGY.

Young men desiring to become Mining Engineers can pursue the regular Course in Civil or Mechanical Engineering, and at its close can spend a fourth year in the study of Metallurgical Chemistry, Mineralogy, etc.

(h.) IN THE SELECT STUDIES PREPARATORY TO OTHER HIGHER STUDIES.

JUNIOR YEAR:

FIRST TERM:—*Mineralogy*—Blowpipe Analysis and Determinative Mineralogy, 8 hrs. *Astronomy*—Recitations, 4 hrs. *English*—Early English, 2 hrs. *History*—Green's Short History of the English People, 2 hrs. *French*—3 hrs. *German*—3 hrs.

SECOND TERM:—*Mineralogy*—Lectures; Laboratory work, 8 hrs. during Winter half-term. *Botany*—Lectures; Laboratory Practice in the identification of Phaenogamous Plants, 2 hrs. during Spring half term. *Physical Geography*—4 hrs. during Winter half-term; Recitations from Guyot and Lectures. *English*—Chaucer, Bacon, Shakspere, 2 hrs. during Winter half-term, 3 hrs. during Spring half-term. *History*—Green's History, continued, 2 hrs. during Winter half-term, 4 hrs. during Spring half-term. *German*—3 hrs. *French*—3 hrs.

SENIOR YEAR:

FIRST TERM:—*Geology*—Recitations, 3 hrs; Excursions. *Zoology*—Lectures, 2 hrs. *English*—Shakspere, 2 hrs. *Meteorology*—Lectures, 2 hrs. *Constitutional Law*—4 hrs. *French*—3 hrs.

SECOND TERM:—*Geology*—continued, 3 hrs. *Zoology*—continued, 2 hrs. during Winter half-term. *Meteorology*—Lectures, 2 hrs. during Winter half-term *Sanitary Science*—Lectures during Winter half-term. *Political Economy*—Recitations, Exercises and Lectures, 4 hrs. *English*—Shakspere, Milton, Dryden, Pope, Gray, and later authors, 3 hrs. *French*—3 hrs. during Winter half-term.

Exercises in English Composition are required during the entire course from all the students. The preparation of graduating theses is among the duties of the Senior year.

Lectures and instruction in Military Science are annually given to the Senior class by the Professor of Military Science and Tactics.

The following account of the various subjects specified in the above scheme will explain the character and aim of the instruction.

ELEMENTARY CHEMISTRY—The exercises in Elementary Chemistry consist in recitations from a text-book, and experiments by the students in the laboratory to illustrate statements in the book. The object of the laboratory work is to facilitate the study of the subject, and to train the students in manipulation and in the observation of chemical phenomena. Notes are required and students are questioned on the experiments. As a class is divided as to scholarship at the end of the fall term, opportunity is given to those who are most proficient to make rapid progress.

ANALYTICAL CHEMISTRY—*Qualitative and Quantitative*—This study is intended to serve two purposes. Analytical Chemistry is used by the advanced student as a means of investigation in scientific or technical researches. The beginner, however, derives from its study advantages of another kind. The knowledge of the properties of chemical compounds, the familiarity with chemical reactions gained by experience in the laboratory, and the development of the reasoning faculties by the application of this knowledge in analytical processes, enable the student to generalize and classify chemical phenomena and aid him to understand the more abstract theories of chemical philosophy. The method of instruction adopted is conformed to this view of the uses of the study. Text-books are used and recitations are required, but the more important part of both study and instruction is performed in the laboratory. In order to solve the problems which are there constantly presented, the student, aided by books and instructors, must learn both principles and their applications. The student, throughout his course in Analytical Chemistry, spends four consecutive hours in laboratory work during five days of the week. The laboratory, however, is kept open seven hours daily for the benefit of graduate students and others who desire to devote more time to this study.

Qualitative Analysis forms a part of the courses in Chemistry, Biology, Agriculture, and Natural History. Quantitative Analysis is one of the more important studies of the Senior year in the Chemical course. It is also included to some extent in the Agricultural Course.

ORGANIC CHEMISTRY is taught by informal lectures and experimental illustrations as well as by text-book drill, a lesson from Bernthsen's Organic Chemistry being given out for each instruction-hour. The class has two exercises weekly throughout the year. The course is adapted to give a fairly complete outline of the subject and some familiarity with the more important bodies and classes of bodies.

In addition to this, the Senior students in the Chemical Course are required to spend 20 hours per week during the latter half of the first term in experimental work in Organic Chemistry. This is intended to supplement the preceding course, and at the same time to serve as a preliminary training for such students as desire to make a special study of Organic Chemistry.

Opportunity is also afforded for the carrying on of original investigations in this subject, either in connection with theses or as a part of the regular work in the case of advanced students.

PHYSIOLOGICAL CHEMISTRY and EXPERIMENTAL TOXICOLOGY—Physical Chemistry is taught by laboratory exercises, illustrative lectures and recitations. Each student is provided with a suitable working place in the laboratory, well equipped with all needed apparatus and material. The regular course of work, designed especially for Senior students in the Biological Course, extends throughout one year and embraces a thorough study of the chemical composition of the various tissues and fluids of the body, together with a study of the chemical and physiological processes of respiration, digestion, secretion, excretion, and nutrition in general.

Beginning with a study of the albuminous bodies, the experimental work extends through the epithelial, connective, contractile, and nerve tissues. Proceeding then to a digestion, the various digestive fluids are studied, artificial digestions are made, and the several products of digestive action isolated and studied. The blood and urine are next considered, and students are taught to make both qualitative and quantitative analysis of the latter and to identify abnormal constituents. A portion of one term is also devoted to a study of the chemical reactions of the more important mineral and organic poisons, and their physiological action is determined experimentally. Students are also taught how to separate poisons from organic tissues and fluids, and to identify them, both by chemical physiological reaction. During the latter half of the second term, Senior year, opportunity is afforded for the carrying on of original investigations on some selected subject in either physiological chemistry or toxicology, in connection with the preparation of graduating theses. The course of work is particularly recommended to students intending to enter upon a course of medical studies.

COMPARATIVE ANATOMY AND ELEMENTARY PHYSIOLOGY—The object sought in the instruction in Anatomy and Physiology, as taught during Junior year, is the manual and mental training of the student in the methods of investigation by which the facts and principles of these sciences have been established, and at the

same time to give him a sufficient knowledge of their elements to enable him to pursue with profit the special studies of the Biological Course as a preparation for medical studies. With this end in view, five forenoons each week are given to laboratory work in Anatomy and Histology. The student, under the immediate supervision of the instructor, dissects specimens of a number of different animals, and is required to make careful sketches and records of his work; he also examines the different animal tissues with the microscope, makes microscopical preparations, and is taught the methods of anatomical and histological investigation. This work is reviewed each week by means of text-book and recitations, or by lecture and examination. The elements of Human Physiology are taught by text-book, recitations, and demonstrations. The physiology of digestion and nutrition is taught during the Senior year in connection with Physiological Chemistry. During the last part of the term there is a short course of lectures on Embryology with special reference to Human Morphology.

Geology—The course in Geology includes recitations and oral instructions, extending through the entire year on alternate mornings. During the first half-year, the recitations are attended by the entire Senior Class, except those in the course in Mechanical Engineering. This part of the course includes Physical, Lithological and Dynamical Geology. These subjects are illustrated by diagrams and specimens. During the first term, each student is required to make a collection containing a specified number of the most important rocks and minerals, and to pass a thorough examination upon them at the end of the term; the object is to compel every student to become personally familiar with the appearance, as well as with the composition and other characters, of the rocks and minerals that are of the most importance in Geology, as well as in the arts.

The last half of the year is devoted to Historical Geology and Palaeontology. This part of the course is pursued by all the Seniors except those in the courses in Mechanical and Civil Engineering. Suitable collections of fossils are used to illustrate the object.

Opportunities are afforded for optional geological excursions during the warmer months.

Mineralogy—The instruction in Mineralogy is carried on by means of practical work in a laboratory especially fitted up for the purpose, and is intended to familiarize the student with the common minerals, attention being devoted especially to those which are of economic, geological, or scientific importance. To understand better the chemistry of the subject, the student is first made familiar with the simple chemical and blowpipe reactions useful in testing minerals, and applies this knowledge later to the determination of unknown species. The students have access to a labeled collection where they can study the properties of the minerals and make comparisons, and also to extensive unlabeled collections, arranged especially to give them practice and facility in the correct identification of minerals. In addition to the laboratory work, instruction is given in Crystallography, illustrated by a collection of models and natural crystals. The lectures in Descriptive Mineralogy to the more advanced students are illustrated by means of the extensive private collection of Professor Brush. The laboratory is provided with apparatus for the thorough chemical and physical investigation of

minerals, and with an extensive library to which students have access. The laboratory is open seven hours each day to accommodate any who desire to devote more time and attention to the subject than is laid out in any of the prescribed courses.

ZOOLOGY—The instruction in Zoology includes a course of lectures on Systematic Zoology, Morphology, and Embryology, which are attended by all the Seniors except those in the courses in Mechanical and Civil Engineering. These lectures are generally given twice a week, and continue during about half the year. The students are required to keep careful notes of the lectures.

Students in the Natural History Course are also required to pursue a course of laboratory instruction during the second term of the Junior and all of the Senior year. This generally occupies from two to four hours a day on four days of each week. It includes dissections of various classes and orders of animals, with microscopic studies of the finer structures and of minute animal forms, as well as work in systematic Zoology.

Special courses of recitations or lectures on particular subjects are also given when desirable.

BOTANY—The scheme of instruction provides for three successive courses of study, as either ending the study for the ordinary student, or introducing it for one who desires to become a professional botanist.

The first or elementary course, which is required of all the Freshmen, is designed to teach the nature of the visible organs of flowering plants, tracing the life-history of vegetation from seed, through stem and root, leaves, branches, buds, blossoms, and fruit, to seed again. The method consists mainly in the use of some easy text-book, like Gray's Lessons, with whatever illustrations and explanations may be needed to secure the student's attention. The second course, coming the next year, is restricted to the sections in Biology, Natural History, Agriculture, and Selected studies, and is intended to enable the student to recognize the chief natural orders of native plants, with the ability to identify the common species. The class meets two or three times a week in spring and summer, and is practiced in identifying plants, using Gray's Manual as a standard, and employing the ordinary simple dissecting microscope. At this point the instruction for the Select Course ceases; in the next fall term the work for the courses in Biology, Natural History, and Agriculture is entirely practical, books being used only for reference. Students begin with cutting thin sections of some common woody and herbaceous stems, and are shown how to prepare such sections for examination and for permanent preservation as microscopic objects. After acquiring some facility in microscopic manipulation, various parts of flowering plants are brought in for dissection and examination, and towards the close of the term some attention is given to Ferns, Mosses, and Algae. This finishes the course for ordinary students; for those who may desire to prosecute the science professionally, the work is arranged to suit individual requirements, whether it be in the direction of Histology, or of Systematic Botany as applied to flowering plants, or to Ferns, Mosses, Hepatics, or Algae.

MATHEMATICS—The Mathematical studies of the Freshman year are pursued by all members of the class; those of the Junior year by students in the course of

Engineering and properly qualified Special Students who may choose them. During the latter year, in connection with the instruction briefly indicated in the scheme above [p. 88], a course of familiar lectures is given to supplement the ordinary class-room exercise.

PHYSICS—The object of the experimental lectures is not only to elucidate the subjects treated in the text-book employed, but also to extend the treatment of such subjects, and to introduce others where thought desirable. A considerable portion of the work of the year is the preparation for recitation on matter thus presented.

At the end of the fall term, the Freshman class is re-divided into three sections, according to capacity shown in the subjects of Chemistry and Physics. After this, although the experimental lectures are attended as before by the class as a whole, the higher divisions are able to pursue the studies more thoroughly.

The facilities of the Physical Laboratory are extended to such graduate students and Seniors as may desire them.

Course in Advanced Physics—A course of two lectures per week, beginning in January, is supplemented by laboratory work. The earlier portion of the time is devoted to the theory of observation and the method of least squares. The course is optional to all who have a command of the Calculus.

MILITARY SCIENCE AND TACTICS—Instruction in this course is obligatory upon the whole Senior class in all departments. To secure familiarity with definitions and fundamental principles, a concise text-book is used for recitations and reference. The work is carried on chiefly by lectures, upon which satisfactory notes must be submitted. Such topics as the following are discussed: Military Economy; the American military problem; organization and re-organization; modern war on field and map; statistics and logistics; the combined use of "the three arms"; strategy and campaigning; orders of battle and grand tactics; special operations of war and field service; minor tactics and the art of war; use of cavalry in campaign and battle; use of artillery and the Franco-Prussian war; use of infantry and the Turko-Russian war; and finally a summary of "the Eastern Question." The course will terminate with an examination, and a special military certificate is awarded, by the Regular Army officer in charge of the department, to such students as attain a sufficient degree of proficiency, and give evidence of military aptitude. In connection with this course a brief original paper is required.

CIVIL ENGINEERING—The object of this course is to give a thorough preparation, first of all, in the principles of the various sciences involved, and afterwards, as extensive practice in the application of these principles as the time at disposal, the ability of the students, and the facilities and plant permit.

Under the first head are included such subjects as Mathematics, Physics, Mechanics, Thermodynamics, Astronomy, Geology, Mineralogy, Chemistry, and Botany; and under the second head, Drawing, Surveying, Strength and Properties of Materials, and Design and Construction of various kinds, such as Bridges, Roofs, Foundations, Arches, Retaining Walls, Dams, Water Works, Railroads, Improvements of Rivers and Harbors, Sewerage and Drainage, Water Motors, etc.

The first division includes Civil Engineering as a Science, the other, Civil Engineering as an Art. The ground covered by the first is definite, and the instruction is made as thorough as possible. The ground covered by the second is of almost indefinite extent. Here, by a careful selection of practical examples, such as occur in engineering practice, the application of principles is illustrated, and together with the analytical or algebraic methods, the student is also instructed in practical graphic solutions, wherever such solutions present a special value. Much time is devoted to geodetic operations and to surveying in the field. Instruction is given in the practical operations connected with the reconnaissance, location, and surveys of roads, canals, and railroads, such as setting out, cross-sectioning, setting grade stakes, calculation of earthwork, etc. Thorough instruction is given in drawing and design, the construction of working drawings, and principles of designing as applied to bridges, roofs, etc.

The instruction is by means of practical exercises, lectures, and recitations, so combined as to develop as far as possible the mental powers of the students. Visits of inspection are made at suitable intervals to private and public works of engineering interest.

The entire course requires five years, three years of undergraduate and two of graduate instruction; and a Thesis of merit upon some approved subject, accompanied by designs and estimates, is required upon the completion of the course, as also at the end of the first three years. Examinations are also held at the end of every term and year.

In what follows, such details are given as may be of interest to those who contemplate taking the course.

Mathmatics—6 hours weekly, Junior year, both terms. See Synopsis of Course.

French and German—Students in this course take in the Junior year the regular studies of the Junior class in both German and French, 3 hours each. In the Senior year, French is continued, 3 hours to the end of the Winter half-term.

Drawing and Descriptive Geometry—Drawing is begun at once in the first term of the Freshman year, under the charge of the Professor of Drawing in the Art School, and includes practice in free hand drawing. In the second term, under the Instructor in Instrumental Drawing, the students take isometric drawing with application to drawing from models and structures by measurement, shading, tinting, conventional use of colors, principles of orthographic projections, and practice in making simple working drawings, 4 hours both terms.

The Drawing of Junior year, 3 hours both terms, includes Descriptive Geometry, the drawing of structures from measurement, and elements of design for simple structures. The instruction is by recitations, lectures, practical exercises and models, and is under the charge of the Instructor of Instrumental Drawing and the Professor and Instructor of Civil Engineering. Included in the work of this year is also the mapping of surveying field notes.

In the Senior year, the drawing consists of the mapping of the surveys of that year, and the designing of structures and finished drawings, designs and estimates, under the charge of the Professor and Instructor of Civil Engineering, 6 hours both terms.

Surveying and Field Engineering—The instruction in the field occupies about 20 hours for six or more weeks in both terms of Junior and Senior year. The exer-

cises at these times are so arranged as to secure as much consecutive time as possible in the field. The work of the Junior year includes the use and adjustment of instruments; practice surveys; recitations and lectures upon surveying operations and methods of keeping field notes. Levels are run, surveys made, plotted and checked; blue print copies of drawings made, the use of compass, level and transit acquired. In the second term of Junior year, land and topographical surveys are made and railroad curves run.

In the first term of Senior year, a line of railroad is located and set out from a contour map previously obtained, grades and curves established and set out, and computations made. The theory of economic location is taught by lectures and recitations in connection with the field work. The work is arranged so that each student has sufficient practice in all the various operations. The text-books used are Gillespie and Johnson's works, Henck's Field Book, Gore's Elements of Geodsey, and Merriman's Theory of Least Squares. The course is under the charge of the Professor and Instructor of Civil Engineering, aided by several assistants.

Mechanics of Engineering—Senior year, 6 to 8 hours, both terms. The text-books of Weisbach, 1st and 2d volumes, are used in connection with lectures and solutions of practical problems in illustration of the various topics. The course includes thorough instruction in the strength of materials, the stability of foundations, retaining walls, dams and embankments, and masonry arches, by lectures and graphic methods. Questions of hydraulics, water supply, and measurement of discharge, receive attention, and the theory and construction of water motors. A course in Thermodynamics with application to air and steam engine is also included.

Construction and Design—Senior year, 6 hours both terms. A thorough course is given in the determination of stresses and the detailed design of roofs, bridges, etc., with working drawings, specifications, and estimates. Visits of inspection are made, and recitations and lectures held in connection with the work in the drawing room.

Astronomy—This course occupies 6 hours during the second term of Senior year, and includes practical work and the use of the sextant and transit in determining time, latitude and azimuth.

Geology—This course occupies 3 hours up to the middle of the second term of Senior year.

Mineralogy—This course, under the Professor of Mineralogy, occupies three hours up to the middle of the second term in Senior year.

A course of lectures on the theory of electricity and its application by the Professor of Physics, is open to students in this department, and can be taken as a part of the preparation for a graduate course in the higher branches of electrical science.

Military Engineering—The object aimed at is to disseminate military information, and to awaken interest in the application of the arts of peace to those of possible war. In connection with the courses of Civil Engineering and Military Science, lectures will be given upon such topics as: systems of fortifications; sea-coast defenses; hasty entrenchments; passage of rivers and military bridges; military reconnaissance, and instruments; battlefield telemetry and methods;

sea-coast range-finding, and ship-tracking devices; gunpowder and ballistic machines; high explosives and demolitions; gun metals, modern ordnance and gunnery; armor plates, turrets, projectiles, and fuses; torpedoes, submarine mines, military electric installation, and countermining.

MECHANICAL ENGINEERING—The objects aimed at in the plan of instruction in this course are, to give to the student a thorough training in elementary and advanced Mathematics and Physics, and their application to the Science of Construction; to make him familiar with the general principles of Engineering and with the practical details of mechanical construction through which these principles are made useful; and to enable him ultimately in beginning the work of his profession to bring to bear upon it a well balanced store of theoretical and practical knowledge, and a mind trained in correct habits of thought and work.

The complete course covers five years, three of which are spent in undergraduate study, and two in a graduate course, a portion of which may be spent in actual practical work. The subjects and methods of instruction in the undergraduate course are as follows:—

Mathematics—See synopsis, page 89.

French and German—Students take in the Junior year the regular studies of the Junior class in both French and German. In the Senior year, French is continued to the end of the winter half-term.

Surveying—A short course in Surveying comprises lectures on methods of surveying and the construction and use of instruments, also practice of field work in the use of the level and transit, city surveying, establishing grades, and laying out buildings.

Shop Visiting divides the time equally with Drawing in the Junior year until the spring recess. The student, accompanied by the instructor, is employed in studying machinery in use and in process of construction in different machine shops in the city. He is required to make satisfactory, carefully dimensioned sketches, from measurements taken by himself, of the complete machines and their parts, and to describe the tools and mechanical operations used in producing the simpler pieces.

Drawing—Descriptive Geometry is taught in the drawing room by lectures and recitations, and by exercise at the drawing board, where the problems are solved graphically by the student. Instruction in drawing Machine Elements is given in the Junior year. Models and cartoons showing examples of approved practice are used by the instructor, who also gives personal attention to each student's work at the board as it progresses.

Principles of Mechanism—This is a course in theoretical and applied Kinematics. Instruction is by text books and lectures illustrated by diagrams and models, an extensive collection of which belongs to the School and is accessible to the student.

Steam Engine—Recitations and lectures in this subject begin in the Junior year, after the spring recess. They relate to the structural details of engines and to the mechanical principles involved in their working. The subject is continued in the first term of Senior year, when particular attention is directed to various kinds of valve gear, the governor, the fly-wheel, balancing, and the effect of the weight of the reciprocating parts. In the second term of Senior year, the study of *Steam Boilers* takes the place of that of Engines.

Indicator Practice—In the Senior year, the student is afforded opportunities to apply the indicator to various engines in operation, and has practice in reading indicator cards and measuring them by the planimeter. He is taught to detect such defects in the engine as are shown by the cards.

Applied Mechanics—In this course lectures, recitations, and exercises in the solution of practical problems, relate to the topics specified under this head in scheme on page 89.

Thermodynamics—Recitations and lectures on the mechanical theory of heat and its application to hot-air engines, gas engines, and the steam engine.

Machine Design—The course in this subject consists chiefly in practical exercises at the drawing board, and partly in lectures on the functions of machines and the mechanical principles which are applied in determining the proportions of machinery. The student, under the guidance of an experienced instructor, is employed in making complete working drawings of machines, many examples of which are in the drawing rooms and the basements of the school. He does not copy the examples, but is required to change the dimensions and in many cases to alter the design, and is ultimately taught to make partly new designs of important machinery, such as cranes, yacht engines, machine tools, boilers, etc. The discipline the student receives is such as he would obtain in the drawing office of an engineering establishment, while he is also carefully instructed in the theory of the subjects he deals with, and in the practical bearing of all his work.

In the Senior year, several excursions are made by the class, accompanied by one or more instructors, to neighboring manufacturing and engineering centers where large manufactories, pumping works, ocean steamers, etc., are visited Full notes must be taken, and a satisfactory written report upon the machinery examined is required of the student.

Thesis—Before graduating, the student must present a satisfactory thesis on some subject approved by the professor in charge of the department of Mechanical Engineering.

A course of lectures on the theory of Electricity and its applications is open to students in this department, and these lectures can be taken as a part of the preparation for a graduate course in the higher branches of electrical science.

ASTRONOMY—Students in the Select Course receive instruction in Astronomy during Junior year, first term, four hours per week.

Students of Civil Engineering during the second term of their Senior year have six recitations per week, and also practical experience in the determinations of time, azimuth, latitude, longitude, etc.

ENGLISH—The course is designed to give the student acquaintance with the great representative writers of the various epochs. A history of the language is one of the studies of the Freshman year; and after that year the study of the language is made entirely subordinate to that of the literature. During first term of Junior year, however, extracts from Early English authors are read, and Early English Grammar studied, so as to familiarize the student with the inflections then in use and the distinctions between the leading dialects. It is the aim of this term's work to give such knowledge of forms, and to some extent of words, that the student will be able to read at sight any Early English author whose writings do not involve special difficulties of language or vocabulary.

With the second term, the regular study of English literature proper begins with Chaucer; and for the rest of the course till the end of Senior year the following authors are read: Bacon, Shakespeare, Milton, Dryden, Pope, Gray, Goldsmith, and later writers. Those mentioned in the list are always studied, but other authors not named are also taken up, the course varying somewhat in different years. In all cases, complete works of a writer are studied, not extracts; as, for instance, several of Chaucer's Tales, and several of the plays of Shakspere. The authors are taken up in chronological order, and the literary history of the time is likewise carried on in connection with the great representative writers of each period.

GERMAN—The aim in this department is to give such a knowledge of facts and principles as shall qualify the student as rapidly as possible to use the language for such various purposes as his special needs may require, and particularly to facilitate the use of German treatises in his later special studies. To accomplish this, the course consists of the combination of the study of systematic German grammar with a complimentary and progressive course of oral translation from English into German, the latter being designed for the double purpose of increasing the command of grammatical principles, and through the establishment of a habit of ready and accurate expression, of laying the foundation for future colloquial use of the language. In connection with the foregoing, it is attempted to introduce the student to as many different styles and as many forms of composition as the time allows. For this purpose the reading matter is in general selected from readers and collections prepared for the use of schools in Germany, and characterized by the number and variety of their extracts, thus enabling the instructor to select pieces that illustrate one another and to avoid similar lines of reading with successive classes. Constant attention is paid during a portion of the course to English affinities, to analogies in the formation of English and German abstract terms, to the commoner rhetorical resemblances and differences to the details of arrangement in German sentences, and the development of secondary from primary significations of words.

In view of the shortness of the course there is no attempt to secure any considerable acquaintance with German literature. A body of representative pieces of lyric poetry, however, is made the basis of careful literary study, with special attention to poetic diction and variety of metrical form. Memorizing German poems is practiced to some extent as a class exercise, as also retranslation of dictated literal versions of simple pieces into German verse, in accordance with prescribed rhythm and sequence of rhyme.

Occasionally, when the proficiency of a class allows it, an advanced division is organized, which is thus enabled to read a much larger amount of matter and to pursue more critical methods. The attention of such a division is sometimes given for a few months to extracts treating of leading events in German history, with a collateral course of German historical poetry, the selections being made so as to be mutually illustrative. Historical poems not contained in the text-books are often furnished by dictation.

During the last few weeks of the course, there is an attempt to initiate the student into the art of rapid and intelligent, though uncritical reading, dispensing largely with dictionary and grammar and aiming to form independent habits of

observation and induction. For this purpose recourse is had to entertaining novels.

In general, it is the endeavor, while aiming primarily and constantly at acquiring a working knowledge of contemporary German, to combine habitually scientific and empirical methods, to enforce correct notions as to the nature of language, to secure incidentally some of the most important disciplinary results of elementary linguistic study, and to give some conception, by suggestive questions and occasional statements, of the various special directions which a more extended and advanced course would necessarily take.

The time allotted to the subject is three hours a week during the Freshman and Junior years.

Regular text-books: Whitney's German Grammar, Whitney's German Dictionary; Ahn's Exercises, or Eysenbach's German Exercises.

French—To avoid repetition, it will suffice to state that much the same course is pursued in French as is above detailed for the German, and on like principles. The three weekly exercises extend through the entire Junior, and most of the Senior year, based on a systematic review of the essential elements. In the Junior year, a wide extent of reading is insisted on, beginning with the simpler novels, such as "Le Conscrit," "L'Ami Fritz," "La Petite Fadette," etc., through a scale of diversified vocabulary by which at last sight-reading of such matter as is more appropriate to the department may be profitably entertained. The practical or conversational course runs along parallel with the more systematic study of the language.

In the second year, the aim is to familiarize the student with practical terms and expressions of a scientific cast, rather than with the purely literary language. Hence practical works, such as books of travel and scientific treatises, have seemed best adapted to the general object in view.

History—The greater part of the work is carried on by means of recitations, Green's Short History of the English People being used as a text-book. The students are also required to look up special topics, and to give the results of their studies to the class: the books used for this purpose are drawn from a small historical library in the class-room. The location of places is enforced by the use of outline maps which the students are required to fill in. Particular attention is given to the history of institutions and to the constitutional and economic growth of the country.

Political Economy—In the beginning of the course, an effort is made to familiarize the students with the fundamental principles of Economics, and more particularly to train them in economic reasoning. More difficult problems are then taken up and discussed, and special topics are assigned to the class for investigation. A small library, containing a number of copies of each of the principal authorities, has been provided, in order that the students may be able to familiarize themselves somewhat with the literature of the subject, without expense to themselves.

TUITION CHARGES.

The charge for tuition for undergraduate students is $150 per year, payable $55 at the beginning of the first and second terms, and $40 at the middle of the second term. An additional charge of $5 a year is made to each student for the use of the College Reading Room and Gymnasium, which is payable at the beginning of the first term, making the total charge for that term $60. The student in the Chemical course has an additional charge of $70 per annum for chemicals and use of apparatus. He also supplies himself at his own expense with gas, flasks, crucibles, etc., the cost of which should not exceed $10 per term. A fee of $5 is charged members of the Freshman Class for chemicals and materials used in their laboratory practice, and the same fee is required from all (except Chemical students) who take practical exercises in Blowpipe Analysis and Determinative Mineralogy. A fee of $5 a term is also charged to students in the Zoological and Anatomical Laboratories, for materials and use of instruments.

For graduate students the charge for tuition is one hundred dollars per year.

CHURCH SITTINGS.

Free sittings for students in this department of Yale University are provided as follows: in the Center Church (Congregational); in the Trinity (Episcopal); and in the First Methodist Church.

Those who prefer to pay for a sitting for one year, more or less, in the churches above mentioned, or in any other church of any denomination, will be aided on application to the Secretary of the School.

Sittings in the Gallery of the College Chapel are free as heretofore to the students of this department.

DEGREES.

Students of this department, on the recommendation of the Governing Board, are admitted by the Corporation of Yale College to the following degrees. They are thus conferred:

1. Bachelor of Philosophy: on those who complete any of the three-years courses of study, passing all the examinations in a satisfactory manner, and presenting a graduation thesis.

The fee for graduation as Bachelor of Philosophy, including the fee for Triennial Catalogues, Commencement Dinners, etc., is $10; unless the person taking the degree is also an academical graduate, when it is but $5.

2. Civil Engineer and Mechanical Engineer: The requirements of this degree are stated on pages 47 and 48.

Doctor of Philosophy: The requirements of this degree are stated on pages 45 and 46.

TERMS AND VACATIONS.

The next academic year begins Thursday, September 24, 1891.

For length of terms and vacations, see Calendar, p. 28.

ANNOUNCEMENT IN RESPECT TO STATE STUDENTS.

The scholarships established in this School in consequence of the bestowal upon it of the Congressional grants are designed to aid young men who are in need of pecuniary assistance in fitting themselves for agricultural and mechanical pursuits of life. All applicants must be citizens of Connecticut. In case there are more applicants than vacancies, candidates will be preferred who have lost a parent in the military or naval service of the United States, and next to these such as are most in need of pecuniary assistance; and the appointments will be distributed as far as practicable among the several counties in proportion to their population. The appointing Board for the current year, consisting of the Board of Visitors for the State and the Secretary of the School, will meet on June 23, 1891, and at or about the same time in the year 1892, due notice of which will be given by publication in every county in the State. All applications should be made previous to that time. Blank forms for application will be sent, when requested, by Professor George J. Brush, Secretary of the Appointing Board.

ANNIVERSARY.

The Anniversary of the School is held on Monday of the Commencement week of Yale University, when selections from the graduation theses are publicly read. The degrees are publicly conferred by the President and Fellows of Yale University on Commencement Day.

APPENDIX.

ENTRANCE EXAMINATION PAPERS.

The following are the papers for 1890, upon which applicants for admission were examined at the June and September examinations.

ARITHMETIC.

June, 1890.

(1.) Find the greatest common divisor of 187, 442, and 969.

(2.) Divide and multiply 427 by 0.0023.

(3.) Find the sum and difference of $8\frac{1}{3}$ and $5\frac{3}{16}$.

(4.) If $300 is paid for the work of 20 men 6 days, what should be paid for the work of 8 men 3 days.

(5.) What is the bank discount and proceeds of a note for $890 payable in 90 days, discount 6%.

(6.) Extract the square root of 0.0125 to three places of decimals.

(7.) Reduce a pressure of 80 pounds on each square inch to kilograms per square meter.

ARITHMETIC.

September, 1890.

(1.) Multiply and divide $3\frac{1}{16}$ by 8.028.

(2.) What would be the pressure on each square inch at the base of a column of water 10 feet high, the weight of a cubic foot of water being 62.5 lbs.

(3.) For what sum must a note be drawn, payable in 90 days, without interest, that the avails may equal $600, when the note is discounted at a bank at 6%.

(4.) Extract the square root of 3.002 to three places of decimals.

(5.) How many liters and how many cubic feet of water are contained in a cistern 4 meters in diameter and 3 meters deep.

(6.) If the velocity of a train is 40 miles per hour what is the velocity in feet per second.

PLANE GEOMETRY.

June, 1890.

[Note—State at the head of your paper what text-book you have studied on the subject and to what extent.]

1. Two straight lines which are parallel to a third straight line are parallel to each other.

2. Two sides of a triangle, and the angle opposite one of them, are given. Construct the triangle, giving all possible solutions.

3. The perimeter of the circumscribed equilateral triangle is double that of the similar inscribed triangle.

4. Similar triangles are as the squares on any two homologous lines.

5. The circumference is the limit of the perimeters of the circumscribed and inscribed similar regular polygons when the number of sides is indefinitely increased.

6. The area of a certain polygon is S square feet. Find the area of the similar polygon whose perimeter is in the ratio of m to n to that of the given polygon.

SOLID GEOMETRY.

June, 1890.

[Note—State at the head of your paper what text-book you have studied on the subject and to what extent.]

1. Three parallel planes cut proportional segments from straight lines intersecting them.

2. A plane passed through two diagonally opposite edges of a parallelopiped divides it into two equivalent triangular prisms.

3. The sides of a right triangle are a and b. Compare the volumes of the solids of revolution generated about these sides as axes.

4. Define *polar* triangles. Between what limits must the sum of the angles of all spherical triangles lie? Give proof.

5. Find the volume of a sphere whose area in 16π.

PLANE GEOMETRY.

September, 1890.

[Note.—State at the head of your paper what text-book you have studied on the subject and to what extent.]

1. Define *locus*. Find the locus of all points equidistant from two parallel lines, proving result.

2. The common chord of two circles is perpendicular to, and is bisected by, the line joining their centres.

3. To divide a given line in extreme and mean ratio. What regular inscribed polygons may be constructed by means of this division? Prove your statement.

4. Two circles are tangent internally, the ratio of their radii being $\frac{2}{3}$. Compare their areas, and also the area left in the larger circle with each.

5. Of all polygons formed of given sides the maximum may be inscribed in a circle.

SOLID GEOMETRY.

September, 1890.

[Note.—State at the head of your paper what text-book you have studied on the subject and to what extent.]

1. The intersections of two parallel planes by a third plane are parallel lines.

2. Two tetrahedrons having a trihedral angle equal, are as the products of the including edges.

3. In any spherical triangle, the greater angle is opposite the greater side, and conversely.

4. A certain spherical triangle is in area, $\frac{1}{5}$ that of its sphere. If the relation connecting the angles be $2A=3B=6C$, find A, B, and C.

ALGEBRA TO QUADRATICS.

June, 1890.

[Note.—State at the head of your paper what text-book you have studied on the subject and to what extent.]

1. Resolve the following expressions into factors:

$$(a)\ x^2-2ax-2bx+4ab;\ (b)\ x^4-1;\ (c)\ x^3+1.$$

2. Reduce $\frac{3x^2+2x-1}{x^3+x^2-x-1}$ to its lowest terms.

3. Solve the equation $3x-\frac{x-4}{4}-4=\frac{5x+14}{3}$.

4. Solve the simultaneous equations:

$$bx+dy=a+c \text{ and } \frac{x}{a}+\frac{y}{c}=\frac{b+d}{bd}.$$

5. Show that, if $\frac{a}{b}=\frac{c}{d}$, then $\frac{a-b}{a+b}=\frac{c-d}{c+d}$.

6. Expand $(a-bx)^4$ by the binomial formula.

7. Simplify the following expressions:

(*a*) $\sqrt[10]{4}$; (*b*) $(81)^{\frac{3}{2}}$; (*c*) $\sqrt{\frac{a^6b^4}{c^6d^2}}$; (*e*) $2\sqrt{8}+3\sqrt{288}$; (*f*) $\sqrt{2}\times\sqrt[3]{3}$.

ALGEBRA FROM QUADRATICS.

June, 1890.

[Note.—State at the head of your paper what text-book you have studied on the subject and to what extent.]

1. Solve the equation $ax^2+a=(a^2+1)x$.

2. Determine all the roots of the equation,

$$x(x+a)\ (x^2-b^2)=0.$$

3. Solve the equation $2(x-4)=\sqrt{3x-2}$.

4. Given the simultaneous equations,

$$x^2+xy=15 \text{ and } xy-y^2=2;$$

to find all the values of x and y which satisfy them.

5. Given the amount of a given principal at compound interest for a given number of years, to find the rate per cent.

6. Expand $\frac{1+2x}{1-x-x^2}$ into a series by the method of indeterminate coefficients.

7. Find the limit of $\frac{(x^2-1)\ (x^2+2)}{x^4-3}$ when x becomes infinite.

ALGEBRA TO QUADRATICS.

September, 1890.

[Note.—State at the head of your paper what text-book you have studied on the subject and to what extent.]

1. Find the highest common factor of
$$2x^3+5x^2-12x \text{ and } 6x^2+x-15.$$

2. Solve the equation $\frac{x-2a}{x+3a} - \frac{13a^2-2x^2}{x^2-9a^2}=3.$

3. Solve the simultaneous equations,
$$3ax-2by=c,\ a^2x+b^2y=5bc.$$

4. What is greater, $\frac{a+x}{a}$ or $\frac{4x}{a+x}$? Prove your answer.

5. Expand $(ax-2b)^5$ by the binominal formula.

6. Simplify the following expressions:

(*a*) $\frac{a+x}{\sqrt{a+a}}$; (*b*) $\sqrt[3]{64a^6b^3}$; (*c*) $\frac{\sqrt{50a^6b^4}}{\sqrt{2a^2b^2}}$; (*d*) $(2\sqrt{a^3})^2$.

7. Reduce $\frac{2}{\sqrt{5}+\sqrt{2}}$ to an equivalent fraction with a rational denominator.

ALGEBRA FROM QUADRATICS.

September, 1890.

[Note.—State at the head of your paper what text-book you have studied on the subject and to what extent.]

1. Solve the equation $4x^2-5x=21$.

2. Ascertain for what value of a the roots of the equation
$$ax^2-4x+2=0 \text{ will be equal.}$$

3. Determine all the roots of the equation,
$$(x-1)\ (x+2)\ (x^2-6x+9)=0.$$

4. Solve the simultaneous equations,
$$2x^2+xy=15 \text{ and } 2y^2-xy=30.$$

5. Determine (1) the number of different arrangements of m different things taken all together and (2) the number of arrangements of the m things taken in sets of n.

6. Insert three geometrical means between 2 and 162.

7. Expand $\frac{a+bx}{a'-b'x}$ into a series by the method of indeterminate coefficients.

TRIGONOMETRY.

June, 1890.

[Note.—State what text-book you have studied on the subject and to what extent.]

1. Express an angle of 10° in radius.

2. Express $\tan \alpha$, successively, in terms of each of the other trigonometric functions of α.

3. Derive the formulæ,

$$\sin \alpha = 5 \sin \tfrac{1}{2} \alpha \cos \tfrac{1}{2} \alpha; \quad \cos \alpha = 1 - 2 \sin^2 \tfrac{1}{2} \alpha.$$

4. Given $\tan \alpha = m$, to find $\tan 2\alpha$.

5. Show that $\sin \alpha = \dfrac{2 \tan \frac{1}{2} \alpha}{1 + \tan^2 \frac{1}{2} \alpha}$.

6. Obtain a formula for expressing a side of a triangle when the remaining two sides and their included angle are given.

7. Given two angles of a triangle 68° 20′.2 and 72°, and the side opposite the first angle 2516.2 ft., to find the remaining parts of the triangle.

TRIGONOMETRY.

September, 1890.

[Note.—State what text-book you have studied on the subject and to what extent.]

1. Express an angle of 0.25 radians in degrees.

2. Give the values of the different trigonometric functions of the following angles: $0, \dfrac{\pi}{2}, \pi, \dfrac{3}{2} \pi$.

3. Derive the formula for the tangent of the difference of two arcs in terms of the tangent of the arcs.

4. Show that the $\tan \left(\dfrac{\pi}{4} - \alpha\right) = \dfrac{1 - \tan \alpha}{1 + \tan \alpha}$.

5. Show that $\cos x - \cos y = -2 \sin (x+y) \sin \frac{1}{2} (x-y)$.

6. Show that $\tan \theta = \dfrac{\sin 2\theta}{1 + \cos 2\theta}$.

7. The three sides of a triangle are as follows: $a = 2504.5$, $b = 2526.7$, $c = 2625.2$; find the angles.

ENGLISH GRAMMAR.

JUNE, 1890.

I. Parse the following sentence:

Why did he not come to succor us who had been the friends that had always stood by him?

II. State to which of the two conjugations—the strong (or old), or the new (or weak)—the following verbs belong: (1) *bring*, (2) *drive*, (3) *say*, (4) *begin*, (5) *tell*, (6) *hit*, and (7) *help*. Give in each case the reason for assigning it to the conjugation you do.

III. What are the relative pronouns? Give the rule for the agreement of the relative with the antecedent.

CAESAR.

JUNE 26, 1890.

I. *Translate as literally as possible:*

1. Tum demum Liscus *oratione* Caesăris adductus, quod antea tacuerat, proponit: Esse nonnullos, quorum auctoritas apud plebem *plurimum* valeat, qui privatim plus possint, quam ipsi magistratus. Hos seditiosā atque improbā *oratione* multitudinem deterrere, ne frumentum conferant, *quod* praestare debeant.

2. Quum ab his quaereret, *quae* civitates quantaeque in armis essent et *quid* in bello possent, sic reperiebat: Plerosque Belgas esse ortos ab Germānis, *Rhenumque antiquitus* transductos propter loci fertilitatem ibi consedisse, Gallosque, qui ea loca incolerent, expulisse.

3. His nuntiis acceptis, Galba, quum neque *opus* hibernorum munitionesque plene essent perfectae, neque de frumento reliquoque commeatu satis *esset provisum*, quod, deditione factā obsidibusque acceptis, *nihil* de bello *timendum* existimaverat, consilio celeriter convocato, sententias exquirere coepit.

4. Ad haec Caesar, quae visum est, *respondit;* sed exitus fuit orationis: Sibi nullam cum his amicitiam esse posse, si in Galliā *remanerent;* neque verum esse, qui suos fines *tueri* non *potuerint*, alienos occupare; neque ullos in Galliā vacare agros, qui dari, tantae praesertim multitudini, sine injuriā possint.

5. His rebus *cognitis*, Caesar legiones equitatumque revocari atque in itinere resistere *jubet*, ipse ad naves revertitur: eadem fere, quae ex nuntiis litterisque cognoverat, coram *perspicit*, sic ut amissis circiter quadraginta navibus, reliquae tamen *refici* posse magno negotio viderentur.

6. Nam fere de omnibus controversiis publicis privatisque *constituunt;* et si quod est admissum facinus, si caedes facta, si de haereditate, de finibus controversia est, iidem *decernunt;* praemia poenasque constituunt. Si quid aut privatus aut populus eorum decreto non *stetit*, sacrificiis *interdicunt.* Haec poena apud eos est gravissima.

II. *Grammatical questions, supplementary to the paper on Latin Grammar:*

1. State the construction of all italicized words in passages 1, 2 and 3.

2. Give the principal parts of all italicized words in passages 4, 5 and 6.

3. Quote in full from the above text an example of indirect statement, and re-write it so as to make it direct.

CAESAR.

September 16, 1890.

I. *Translate as literally as possible:*

1. Helvetii, omnium rerum *inopiā* adducti, legatos de deditione ad eum miserunt. Qui quum *eum* in itinere convenissent seque ad *pedes* projecissent suppliciterque locuti flentes pacem petissent, atque eos in eo loco, *quo* tum essent, suum adventum exspectare, jussisset, paruerunt.

2. Eorum fines Nervii attingebant; quorum de naturā moribusque Caesar quum quaereret, sic reperiebat: Nullum aditum esse ad eos *mercatoribus: nihil* pati *vini* reliquarumque rerum ad luxuriam pertinentium inferri, quod *iis* rebus relanguescere animos et remitti virtutem existimarent.

3. Armis obsidibusque acceptis Crassus in *fines* Vocatium et Tarusatium profectus est. Tum vero barbari commoti, quod oppidum, et *naturā* loci et manu *munitum*, paucis *diebis*, quibus

eo ventum erat, expugnatum cognoverant, legatos quoquoversum dimittere, conjurare, obsides inter se dare, copias parare coeperunt.

4. Quod ubi Caesar *comperit*, omnibus his rebus *confectis*, quarum rerum causā transducere exercitum constituerat, ut Germānis metum *injiceret*, ut Sigambros *ulcisceretur*, ut Ubios obsidione liberaret, diebus omnino decem et octo trans Rhenum *consumptis*, satis et ad laudem et ad utilitatem profectum arbitratus, se in Galliam recepit pontemque *rescidit*.

5. Equites hostium essedariique acriter proelio cum equitatu nostro in itinere *conflixerunt*, ita tamen ut nostri omnibus partibus superiores fuerint atque eos in silvas collesque *compulerint*; sed, compluribus *interfectis*, cupidius insecuti nonnullos ex suis amiserunt.

6. Quae civitates commodius suam rem publicam administrare existimantur, habent legibus *sanctum*, si quis quid de re publicā a finitimis rumore aut famā acceperit, uti ad magistratum *deferat*, neve cum quo alio communicet: quod saepe homines temerarios atque imperitos falsis rumoribus terreri et ad facinus *impelli* et de summis rebus consilium capere cognitum est.

II. *Grammatical questions, supplementary to the paper on Latin Grammar:*

1. State the construction of all italicized words in passages 1, 2 and 3.

2. Give the principal parts of all italicized words in passages 4, 5 and 6.

3. Quote in full from the above text an example of indirect statement, and re-write it so as to make it direct.

LATIN. (*Exercises and Grammar.*)

June, 1890.

I. *Translate into Latin*:

1. Caesar received[1] hostages.[2]
2. Hostages were received by Caesar.
3. Caesar leads-back[3] the army[4] to[5] the sea.[6]
4. The army was led back to the sea by Caesar.

5. Hostages having been received, Caesar led back the army to the sea.

6. Caesar says[7] he will lead back the army to the sea.

7. (*Re-write sentence* 6, *and substitute direct for indirect statement.*)

8. Caesar said he would lead back the army to the sea.

9. (*Re-write sentence* 8, *and substitute direct for indirect statement.*)

10. Caesar formed-the-design[8] of leading back the army to the sea.

[1] accipĕre.
[2] obses.
[3] reducĕre.
[4] exercitus.
[5] ad.
[6] mare.
[7] dicĕre.
[8] consilium capĕre.

II. *Latin Grammar:*

1. Decline *obses*, *exercitus*, *mare*.
2. Decline *idem*, *nullus*, *ipse*.
3. Compare *primus*, *major*, *facilius*, *optime*.
4. Write the synopsis, active and passive, of *ducĕre* (*duxi*, *ductum*).

LATIN. (EXERCISES AND GRAMMAR.)

September, 1890.

I. *Translate into Latin.*

1. The envoys[1] came[2] to[3] Caesar.
2. Caesar sent back[4] the envoys immediately.[5]
3. The envoys were sent back by Caesar immediately.
4. The envoys, who had come to Caesar, were sent back immediately.
5. Caesar said he would send back the envoys immediately.
6. (*Re-write sentence* 5, *and substitute direct for indirect statement.*)
7. Caesar says[6] he will send back the envoys immediately.
8. (*Re-write sentence* 7, *and substitute direct for indirect statement.*)
9. Caesar says, "I have sent back the envoys immediately."

10. (*Re-write sentence* 9, *and substitute indirect for direct statement.*)

[1] legatus.	[4] remittĕre.
[2] venire.	[5] statim.
[3] ad.	[6] dicēre.

II. *Latin Grammar:*

1. Decline *castra*, *locus*, *iter*.
2. Decline *facilis*, *integer*, *totus*.
3. Compare *facilus*, *inferior*, *acriter*.
4. Write the synopsis, active and passive, of *nuntiāre* and of *mittĕre*.

GEOGRAPHY.

June, 1890.

1. Bound the State of Alabama; what is its seaport and how is it situated?
2. Bound British India; give the situation of two cities in it; describe two rivers in it, tell where each rises, its course and where it empties.
3. Where are the West Indian Islands; what waters lie about them? Give the names and situations of such of the islands as you can.
4. Describe the river Rhine; where does it rise; what is its course; where does it empty; and what countries does it pass through or by?
5. Where are the following cities: Lexington, Venice, Melbourne, Minneapolis, Vera Cruz, Bahia?
6. Bound Denmark; what is its capital and how is it situated?
7. Give the names and situations so far as you can, of the seaports in Europe and Africa on the east side of the Atlantic Ocean.

GEOGRAPHY.

September, 1890.

1. Bound the State of New Hampshire; give the names and situations of two towns in the State; and of two rivers in the State or on its borders.

2. Bound Siberia; to what government does it belong; give the names of two rivers in the country, tell the course of each and where each empties.

3. What Islands are in the Mediterranean Sea? Describe the situation of such as you can.

4. Describe the river Oronoco; tell where it rises, its course and where it empties.

5. Where are the following cities: Los Angeles, Atlanta, Buenos Ayres, Sydney, Naples, Quebec?

6. Bound Austria, what is its capital and how is it situated? What large river passes entirely through the country?

7. Give the names and situations so far as you can of the seaports of America on the west side of the Atlantic Ocean.

June, 1890.

I. Describe the settlement of Carolina and its government.

II. Give an account of the Stamp Act, the Massachusetts Bill and the Transportation Bill.

III. By what treaty was the Revolutionary War ended and what were its terms?

IV. What was the Hartford convention?

V. What were the causes and the chief conquests of the Mexican War?

VI. Give an account of the impeachment of President Johnson.

N. B.—The dates are to be given wherever possible.

September, 1890.

I. Give an account of the career of Captain John Smith.

II. Describe Wolfe's capture of Quebec; in what war did it occur and what treaty ended the war?

III. Give an account of the Battles of Lexington, Germantown and Princeton.

IV. When and how were Louisiana and Florida acquired?

V. What was Clay's Omnibus Bill?

VI. Give the principal causes and results of the civil war.

N. B.—The dates are to be given wherever possible.

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THIRTEENTH ANNUAL REPORT

OF THE

STATE BOARD OF HEALTH

OF THE

STATE OF CONNECTICUT,

FOR THE

YEAR ENDING NOVEMBER 30, 1890.

WITH THE

REGISTRATION REPORT FOR 1889, RELATING TO BIRTHS, MARRIAGES, DEATHS AND DIVORCES.

Printed by Order of the Legislature.

NEW HAVEN:
TUTTLE, MOREHOUSE & TAYLOR, PRINTERS.
1891.

State of Connecticut.

OFFICE OF SECRETARY OF STATE BOARD OF HEALTH,
NEW HAVEN, CONN., DEC. 1, 1890.

To his Excellency, Morgan G. Bulkeley, Governor of Connecticut:

SIR: In compliance with the laws of the State, I have the honor to present to you the Thirteenth Annual Report of the State Board of Health for the year ending Nov. 30, 1890, and also the Registration Report of the Bureau of Vital Statistics for the year ending Dec. 31, 1889.

Very respectfully,

C. A. LINDSLEY, M.D.,

Secretary of State Board of Health and Superintendent of Registration of Vital Statistics.

MEMBERS OF THE BOARD.

	Term Expires.
Hon. A. E. Burr, Hartford,	1895
John S. Butler, M.D., Hartford,*	1893
Prof. W. H. Brewer, New Haven,	1891
Grove H. Wilson, M.D., Meriden,	1895
Hon. Elisha Johnson, M.D., Hartford,	1893
Ralph S. Goodwin, M.D., Thomaston,	1891
Prof. C. A. Lindsley, M.D., New Haven.	

OFFICERS OF THE BOARD.

Hon. A. E. Burr, President.

Prof. C. A. Lindsley, M.D., Secretary and Treasurer.

State Superintendent of Registration and Vital Statistics.

Dr. C. A. Lindsley, as Secretary of the Board.

* The vacancy caused by the death of Dr. Butler in July was filled by the Governor, by the appointment of

Dr. N. E. Wordin, of Bridgeport.

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GENERAL REPORT.

To His Excellency, The Governor of the State of Connecticut.

SIR:—In conformity with the requirements of the Act establishing a State Board of Health, I hereby submit the thirteenth Annual Report. The chief purpose and ultimate object of establishing a State Board is the conservation and improvement of the health of the people. All the special duties imposed upon the said board, and all the functions with which it is endowed, are designed for the promotion and accomplishment of this most laudable end.

A careful scrutiny of the powers given to the board, and of the means at its disposal to carry on so important an undertaking, would not justify any hope or expectation that quick results or brilliant successes would be conspicuous elements of progress. So far as any immediate influence upon the public health may be exerted by the State Board, it must be in an indirect manner.

Its specified duties are to make itself acquainted with whatever concerns the health of the citizens of the State—to investigate the causes of disease, the sanitary influences of localities and occupations; also to inspect the conditions relating to heating, ventilation, drainage, sewering, water supply, etc., as they relate to the health of the occupants of prisons, hospitals, and other public institutions, and when found detrimental to health to "*suggest* remedies." It should be observed that the Board is not clothed with authority to order unsanitary and dangerous conditions to be remedied, but only to "suggest such remedies as it may consider suitable."

In short so far as the duties and functions of the State Board of Health relate to any or all the influences which affect public health, they are wholly performed when the said board suggests or advises what ought to be done. In other words, it is solely an advisory body, without mandatory authority over any condition or influence, however dangerous, which may threaten the public health.

A prominent function is to educate the people—to preach the gospel of sanitation—to reiterate over and over again the precepts of health, and the fundamental laws of public hygiene. Akin to this has been the practical work of calling the attention of town boards of health to the duties and responsibilities which officially devolve upon them, and to suggest the methods of work and the lines in which their efforts should be directed.

It seems to be necessary that this explanation should frequently be made, because the officers of the board are so often appealed to, to exercise an authority which they are supposed to possess over some condition menacing the public health, which the local health authorities refuse or neglect to abate.

There are also always some critics who express surprise that so little apparent progress has been made in improving the health of the State after so many years of service ; these said critics being ignorant, or feigning to be ignorant that the State Board is only a school teacher, without authority to maintain order, or even to command the respectful attention of his pupils.

Yet under these disadvantages, positive and real progress has been made ; the work of education has been going on ; sanitary investigations in all parts of the State have been made ; the causes of disease have been frequently investigated ; and the origin of many epidemics has been traced. The advice of the State Board has been frequently sought and given, on matters relating to public water supplies, to drainage, to sewage disposal, to the hygiene of public buildings, etc. The practical duties of the Board as laid down in the Act which established it, have been steadily and attentively performed ; and with each returning year they are increasing.

Possibly the foundation which has thus been laid, gives better promise of future usefulness, than if the work had been more aggressive. Some hostility under our form of town governments might have been excited by proceedings not appreciated on their merits, and which might have been regarded as an exercise of arbitrary State power.

But the State Board has done more than the literal terms of its charter demands. Appreciating that its own executive powers were so extremely limited, it has felt that it was acting within the sphere of its responsibilities, and discharging an implied duty if it could organize and make effective that branch of the administration of public hygiene, which does possess executive power,

which has the authority under the statutes of the State to enforce and execute the sanitary laws.

This executive authority as given by the statutes of Connecticut resides exclusively in the local boards of health. In fact however, the local boards, with few exceptions, at the time the State Board was organized, existed only in name. A very large majority of them never convened as a board of health, or performed a single official act in that capacity.

The charter of the State Board failed to bring it in relation with the local boards, except in the most superficial and indefinite manner. It simply imposed an obligation on each to supply such sanitary information as each may have to the other, when requested ; and that the local boards should present to the State Board "copies of all their reports and other publications."

Now inasmuch as the local boards, except in an exceedingly few instances, had never made any reports or publications, of course the State Board received none. And again, as neither was in a position to know when the other might have desirable "sanitary information," there was not frequent occasion to ask for it.

The State Board has constantly realized its restricted limits of active service, and always endeavored to use to the utmost those means which it could employ.

A very superficial examination of the hygienic condition of the State, served to show something of the urgent need, almost everywhere, of sanitary improvement. The primitive customs of our forefathers in regard to the disposal of sewage were still retained even in the largest cities, together with many other old-time practices, scarcely less objectionable.

It was at once evident that the only way of effective sanitary work would lie through the action of the executive branch of hygienic administration, viz : the town boards of health. To the accomplishment of this end, the State Board has constantly sought a closer and more intimate relation with the town boards. Circulars of information on many subjects of sanitary importance have been sent to them. Urgent appeals have been made to them to undertake systematic work within the limits of their respective jurisdictions, and all the resources included within the range of influences known as "moral suasion" have been applied with more or less success.

The need of some additional legislation became very evident, and the State Board has obtained the passage of some laws which

have resulted in securing the organization of a town Board of Health in every town in the State, with officers authorized to act promptly in all cases.

This has been followed by the enactment in many towns of a code of sanitary regulations, often including the requirement, of the immediate notification of all cases of infectious diseases.

This latter requirement is of so recent date, and the number of towns adopting it as yet so few, and its observance in them as yet so imperfect, that its operation in limiting the spread of infectious diseases is not very marked, upon the mortality of the whole State. It is far more conspicuous in towns where it is practiced and where such notification is followed by the observance of all such precautions as the circumstances require. The advantage of the law is most strongly exemplified in those places where small-pox has occurred, and where immediate notification and proper precautions have been taken, contrasted with the towns in which these have been neglected. Similar illustrations may be found in the management as compared with the mismanagement of out-breaks of Diphtheria and Scarlet Fever.

There needs to be a still closer and more intimate intercourse between the State Board and the town boards. Recent legislation is promoting this end. A law passed in 1887 requires the clerks of town boards to notify the Secretary of the State Board of the presence of Small-Pox or Cholera in their respective towns, or the occurrence "of any epidemic of infectious disease."

The Secretary has reason to believe that this law is fairly well observed by most towns, although he has sometimes first learned of local epidemics through the newspapers, and obtained verification or correction of the newspaper version by writing to the clerk of the local board of health.

The State Board is almost wholly dependent upon such sources of information, and upon the monthly mortality reports of the Town Registrars for its knowledge of the correct condition of the health of the State. It is but just to add that a small corps of sanitary correspondents contribute monthly very valuable information also. These are voluntary but highly valued correspondents, and the Secretary would be greatly pleased if their number was multiplied by five, or more.

In order that the information so received may be utilized to the best advantage, the Secretary has for several years past issued a monthly Bulletin to all the local boards of health, and to

such other citizens of the State as desire it, giving as accurate a statement of the condition of the public health during the previous month as can be made from such facts.

From the foregoing sources of information the Secretary is enabled to give the following account of the health of the State for the year ending November 30.

The registered deaths for the year will probably exceed the number of any previous year in the history of the registration of vital statistics in Connecticut. This excess is, by common consent, attributed to the baneful influences of an epidemic beginning in December, 1889, and known as the Influenza.

Influenza.

In the month of December a disease which, because of its almost universal prevalence, might be called *pandemic*, appeared over the whole North American continent; having previously occurred as widely in the countries on the other side of the Atlantie Ocean. One of the most remarkable features of this disorder was its almost simultaneous appearance in widely separated parts of the United States. Its invasion of distant places was so nearly contemporaneous as to baffle all attempts to trace its progress or even indicate the direction of its course.

Although at the time of its highest typical development in Connecticut it was not regarded as a disease of very formidable character, or one to which was attributed many fatal cases, yet, at this writing, nearly one year after its first appearance, it seems plainly evident that, in its consequences, both direct and indirect, it has proved to be one of the most destructive pestilences that has ever afflicted our people. Its pernicious effects were not limited to the few weeks while it prevailed in its most characteristic form. During the winter the mortality was greater than at any corresponding period in the history of the State; nor only that but for months afterwards, there was a marked increase of mortality from a variety of diseases contracted during that period, and even yet many persons have never recovered from the physical infirmities which were justly attributed to that distemper.

In a subsequent part of this report will be found a special paper on the epidemic by Dr. C. Purdy Lindsley.

Small-Pox.

At a conference of delegates from the several States and Provincial Boards of Health, which was held in Toronto, Canada, in 1886, a mutual agreement was entered into, to report to each other certain infectious diseases. The following notices have been received at the office of the Connecticut State Board of Health, during the year ending November 30, 1890: Of Small-Pox—From Illinois: 3 cases reported in December, 1889. From Kansas: 1 case in April. Maine: 4 in June. Massachusetts: 1 in February and 1 in May, 1890. Michigan: 3 in December, 1889, and 2 in February, 1890. Minnesota: 1 in December, 1889. Wisconsin: 1 in February, and from Montreal, P. Q., 2 in July, and 1 in November.

Leprosy—From Pennsylvania: 1 in April and 1 in November.

Typhus Fever—From New York: 6 in January, 1890.

Small-Pox—After an interval of more than a year this dreaded disease reappeared in our State, through the very ordinary and usual agency of a mismanaged paper mill. At Windsor Locks, the Seymour Paper Company employed persons not protected by vaccination, in the rag department. From this origin it soon appeared in several other towns in the State. In some of these towns it was restricted to the primary cases, and in other towns from inexperience on the part of the health officials, notably in Meriden, it was allowed to spread its infection to many other persons.

More detailed accounts of its prevalence will be fonnd in special reports.

Diphtheria.

As well as can be judged at this time from the monthly mortality reports of Registrars and from the statement of the sanitary correspondents of the Board, this disease has been somewhat less prevalent than in 1889. Still, the mortality has probably not been less than the average for the past ten years.

Reports have been received of its presence in more than 80 towns—about one-half of the whole number in the State. The information is not sufficiently precise in details in many instances to justly exact numerical statements. But, inasmuch as some towns have experienced more than one invasion, it is fair to assume that there have been, during the year, not less than 100 distinct and separate outbreaks, in the State. These separate

outbreaks have been the cause or origin of more or less subsequent cases of the disease according to the precautions which were adopted with the primary cases.

The public are getting to recognize the fact that the disease is spread by contagion. Under the management of some town boards of health this fact is treated in a practical way, and all primary cases are promptly looked after to prevent the further prevalence of the disease. Other boards of health neglect their duties in this respect, with the inevitable consequence of new cases and probable sacrifice of life.

To many of the town boards of health, in Connecticut, the duties are quite new and unfamiliar. To most of the people of their respective jurisdictions they are equally so. Under such circumstances it too often happens that the local board of health is not only without the support of an approving public sentiment to sustain its undertakings, but also without any appropriation from the public treasury to defray proper expenses. Such being the facts the only course is to patiently await the growth of general intelligence on these subjects, assured that the seeds of knowledge have been sown in every community in the State, and that in many places they have not only taken root but have sprung up and are already yielding a harvest.

In a few towns in the State where the cases have been more than ordinarily frequent and fatal, they have still been confined to one or two families in which the disease started, and very often the unhygienic condition of the surroundings have been unfavorable to its prompt extinction.

In other instances the health authorities have not been notified of its existence until the infection had spread to many families in the vicinity. This was notably true of an outbreak (on the eastern side) in the City of New Haven early in the year. The Doctor in attendance neglected notification to the Health Board, and was subsequently fined by the court the penalty which the law inflicts for such offence. Many cases of sickness and several deaths, however, resulted from the doctor's neglect. Another practitioner, in another quarter of the city, was found guilty of the same neglect, and he, too, paid the penalty.

It is not believed that these two doctors were the only offenders, or that all cases which were duly notified to the Board of Health, received the full attention which public safety required. Diphtheria prevailed in New Haven during the year, and partic-

ularly in the early part of it, more than any other contagious disease.

In the New Haven County Home located in the suburbs of that city and containing about 50 children, the disease was thought to have been introduced by the exposure incurred in attendance at one of the public schools. Twelve of the children of the Home took the disease, and in 5 it was fatal. This outbreak occurred in the latter part of winter and early spring.

Brooklyn suffered a limited epidemic, caused by an imported case, in August.

Another outbreak in a few families in Taftville occurred in September. From this 7 or more deaths resulted. The health authorities of the town of Norwich, when informed of it, took such prompt and effective action that it did not extend to other families then.

In Bridgeport the disease got a foothold among some families residing in old tenement houses. The alert and very capable health officer of that city believed it originated in an ancient well in common use but furnishing a suspicious water.

Among other towns which suffered severely from this disease were Ansonia, Hartford, New Britain, and Windsor.

In numerous instances an outbreak, while not limited to the primary case, was, however, restricted to the family in which it occurred. Such an instance happened in Haddam where 7 cases occurred in one family. It was attributed to opening a drain ten rods in length from a kitchen sink to a cesspool.

Typhoid Fever.

Typhoid fever has maintained about its usual prevalence in recent years throughout the State. There is no section of the State from which it has been exempt. Local developments of it, however, have appeared in a few localities, which are deserving of note. The most extensive epidemic during the year occurred in Waterbury. During the month of June, 50 cases of this disease appeared in 35 houses. Certain facts were observed which pointed so significantly to a special milk supply as the source of the infection, that the State Board of Health caused a thorough investigation of the epidemic, which fully confirmed the suspicion regarding the milk.

A report of the Waterbury epidemic, by Prof. H. E. Smith, will be found on a later page of this volume. While typhoid

fever has had its victims almost every month in the year in New Haven, there have been times and places in which the outbreaks were so localized and numerous as to indicate some special local source of the infection.

During the summer such a manifestation of this fever appeared in the 11th ward of the city, where in a limited neighborhood, 15 cases occurred in a very brief time. The source of the infection was not satisfactorily determined, although there was much reason for believing it was a polluted well in common use.

In Norwalk the Health Officer, Dr. Gregory, reported 12 cases as originating by drinking polluted well water.

Beside the foregoing special disease manifestations, there have been also some minor epidemics, usually of limited local extent, but often existing at the same time in different parts of the commonwealth. One of the most important of these was whooping cough; and because that disease involves the lungs it is probable that the unusually large mortality from it is to be in part ascribed to the baneful impression which "La Grippe" has left upon persons afflicted with acute affections of the pulmonary organs.

There have been also many local epidemics of mumps through the State. As this is seldom a fatal disease its prevalence is never indicated by the registration of deaths.

Scarlet fever and measles, it would appear from the reports received, have been less prevalent than usual.

Examinations of Water.

The General Assembly, in 1889, enacted that the following sum be paid out of any money in the treasury, not otherwise appropriated, for the two fiscal years ending June 30, 1891 :

For the State Board of Health for the purpose of investigating the pollution of streams, five thousand dollars ; provided, all unexpended balances at the time this bill is approved, heretofore made for this purpose, are covered back into the treasury.

Since the date when this appropriation became available the State Board has continued the work begun two years before under a similar appropriation. An account of the work heretofore done, will be found in the 10th and 11th Annual Reports of the Board under the title of "Rivers Pollution."

Since July 1st, 1889, the work has been pursued in a different direction from that before followed.

Special attention has been given to the potable waters of the State.

The importance of this enquiry will be at once appreciated when it is stated that a large majority of the people of Connecticut reside in towns and cities which have constructed public reservoirs from which their water supply is obtained.

The recent census gives the total population of the State as 745,881. The residents of towns in which there are already public water supplies will number not less than 500,000. So that about two-thirds of the whole population of the State either do have or can have their drinking water from a general supply intended for common use.

The aim and purpose of this enquiry is to be thorough in every examination made, with a view to reach some definite results which will be of practical utility in the future.

Something more is attempted than a superficial chemical analysis, determining only the grosser pollutions of water. In each case careful chemical analysis is supplemented by a bacterial analysis and a study of the animal and vegetable life always present to a greater or less degree in all surface waters.

The general oversight of the work was committed to Prof. S. W. Williston, of Medical Department of Yale University, while as the special part of his personal work he undertook the study of the microscopic life found in the samples.

Prof. H. E. Smith of the same department of Yale had full charge of the chemical examinations, and Dr. T. G. Lee, lecturer on Histology and Bacteriology, has had the work of bacteriological investigation.

There are about fifty municipalities supplied wholly or in part by public water supplies collected in reservoirs. The varying conditions to which the water is subjected in these reservoirs, and the changes to which it is liable under the variations of climate, sources of collection and artificial storage develop sanitary problems of the highest importance to public health. These important changes make it necessary that frequent examinations be given to samples from the same reservoirs.

It was not possible to make examinations of samples from all the reservoirs in the State, and it became necessary to make a selection and to limit the number to the requirements of the money appropriated.

To meet all the conditions necessary to obtain satisfactory results, examinations have been made continuously every month since July 1st, 1889, of about one dozen of the most important and varied public supplies in the State. The choice had to be governed in some instances by the facilities for obtaining at not excessive cost the samples regularly and promptly. In another part of this volume reports of the work will be found as far as it has progressed.

The Board is obliged to express its regret at the loss of the valuable services of Prof. Williston since August, 1890. He has accepted an appointment to a professorship in the University of Kansas, and has removed to the seat of that institution at Lawrence, in that State. His part of the work has since been divided between Prof. Smith and Dr. Lee.

Personnel of the Board.

The only change in the membership of the Board during the year was occasioned by the death of the venerable Dr. J. S. Butler, the first President of the Board, one who was among the most active and influential in securing its establishment, and whose personal efforts and interest in its work were unflagging while he lived. He died May 21st, 1890, after a long life well spent in the best interests of humanity. Dr. N. E. Wordin of Bridgeport, was appointed by Governor Bulkeley to succeed him for the remainder of his term.

Registration of Vital Statistics.

The systematic registration of the births, marriages and deaths of the citizens of the State has been carried on since 1848, a period of 42 years. The earlier portion of these records were subject to the deficiencies and imperfections incident to an undertaking in which experience of officials and the coöperation of a great many disinterested persons are important factors of success. In Connecticut, as elsewhere, these were in a great degree wanting. But as time went on and as experience was acquired, and the value and practical utility of such records became recognized, registration has improved, and in many respects is not excelled in any State in the Union at the present time.

Upon the organization of the State Board of Health in 1878, the superintendence of this work was made one of its duties. This duty is one which requires a large part of the time of the executive officer of the Board. No branch of his service to the State is more exacting of personal attention or demanding closer watchfulness. From time to time through the influence of the State Board improved legislation has been secured in aid of more complete registration. In the registration report for 1888 the need of still further modification of the present system is discussed and it is hoped will receive some attention from the General Assembly of 1890.

The value of the accurate registration of vital statistics has been repeatedly set forth in the previous reports of this Board. It affords in a brief way the life history alike of a State or of a village. It is to a community, whether large or small, what the interleaves of the big Bible are to the family, a record of the three great events in human life towards which as foci all other interests in life converge—Birth, Marriage, Death. Nor is that all, accurate registration of these three events in man's career, has always been regarded as the true and substantial basis of sanitary work. It affords the only trustworthy means of estimating the actual results accomplished by such work.

Dr. Parkes said of such registration: "The attention now paid to public health is in a large degree owing to the careful collection of the statistics of births and deaths, and of the causes of death, made in England during the last forty years."

"It may truly be said indeed that not only all Europe, but gradually the entire world has been influenced by the work of the Registrar-General of England. We are now able to determine with some precision the limits of mortality and its causes, and are being led up to the consideration of the causes which bring about a high death-rate."

The system practiced under the laws of this State requires a separate record in every town, to be made by the town clerk, who is ex-officio the Registrar of Vital Statistics. The duties of a registrar are peculiar and in several respects unlike those of any other State official. To perform them well requires a considerable amount of special knowledge of technical character and a certain fitness for such work which is not always possessed by the incumbent of the office.

The most important defect, however, in the present method lies in the practical difficulty of utilizing the records after they are made. Scattered as they are through 168 towns, it is only possible to obtain for the compilation of a general report a limited abstract, liable always to such errors and imperfections as necessarily attend work by persons unfamiliar with it, and even incompetent to do it in many cases.

The Personal Labors of the Board.

Besides the regular quarterly meetings which have for the most part been fully attended by all the members, the Board has among other duties personally responded to invitations to visit various towns in the State and make personal inspection of their sanitary condition and give advice in relation to new water supplies and in other cases to the disposal of sewage.

Sometimes the whole Board and in all cases a majority of the members have visited distant towns when a formal request has been made upon them.

In this way the members of the Board have visited and inspected the sources of a public water supply for Litchfield, and given the borough the benefit of their advice.

They have also repeatedly visited Meriden and inspected several sources of water supply to serve the needs of that town.

Litchfield has also during the past year been visited in response to a request from the Board of Burgesses to advise them in regard to a system of sewage disposal. Several interviews with their engineers were held and the conclusions reached were presented to the borough officers in a written report.

They were equally attentive to an invitation from the town of Bristol, visiting that place and giving a formal opinion that their best way was to dispose of their sewage by land irrigation, the facilities for such disposal being peculiarly advantageous.

In like manner they have advised through the officers of the Board, the towns of Southington and Manchester on the same subject.

For the purpose of acquiring a better knowledge of the subject and being better qualified to give advice, several members of the Board have visited and examined the methods of conducting a sewage farm at Cranston, R. I., and at South Framingham, Mass.

One or more of the Board have also examined the sewage works at East Orange, N. J.

These inspections have been made by the members of the Board in order to be familiar by personal examination with the practical working of such sewage disposal systems as have been put in practice in this country.

The Distribution of Circulars.

The practice long ago adopted, of sending circulars to localities where contagious diseases have appeared, giving advice and instruction regarding their prevention and restriction is steadily pursued. Most of the earlier editions have been exhausted, and later editions have been printed with such improvements as increasing sanitary knowledge has suggested.

Frequent requests for them have been received from places where outbreaks of infectious diseases have occurred, and the Board has cumulative evidence of the practical utility of this system of instructing the people.

Local Boards of Health.

The increased number of Annual Reports of local Boards of Health which have been made this year, abstracts of which appear later in this report, attest the growing interest which is manifested in public hygiene.

As has been already said, it is upon the local boards that the execution of sanitary administration devolves. They are the eyes and ears, the feet and hands of the State Board, and it views with much satisfaction and encouragement, this evidence of new activity, of better organization and of more effective work among them.

While almost all of them are far behind what a true ideal of a town board of health ought to be, yet it is well recognized, that the best, the highest development, is always a matter of growth. It should be satisfactory and gratifying to know that seed is well planted and growth has begun, in many instances, vigorously.

THE MEETINGS OF THE BOARD.

ABSTRACT OF THE PROCEEDINGS OF THE CONNECTICUT STATE BOARD OF HEALTH AT ITS MEETINGS DURING THE YEAR ENDING DECEMBER 1, 1890.

QUARTERLY MEETING.

HARTFORD, Jan. 24, 1890.

The regular quarterly meeting of the State Board of Health was held this day, Jan. 24th, 1890, at Hartford, at the Capitol building.

The meeting was opened at 2:30 P. M., Hon. A. E. Burr in the chair. There were present Prof. Wm. H. Brewer, Dr. G. H. Wilson, Dr. R. S. Goodwin and Dr. C. A. Lindsley.

The minutes of the last meeting were read and approved.

The Treasurer read his report, which had been been previously audited and approved by the Auditing Committee. The report was acceptéd and ordered on file.

President Burr made report of the methods proposed for the care of two small-pox patients at Warehouse Point, the select-men having applied to him for advice.

Several communications were read by the Secretary, which did not call for any action of the Board by vote.

The following communication from John S. Billings, Surg. U. S. A., was presented by the Secretary:

DEPARTMENT OF THE INTERIOR,
CENSUS OFFICE, WASHINGTON, January 17, 1890.

Dr. C. A. Lindsley, Sec'y State Board of Health, New Haven, Conn.

DEAR SIR:—I have bsen authorized by the Superintendent of the Census, with the approval of the Honorable Secretary of the Interior, to have copied upon printed schedules prepared for the purpose, the data relating to the records of death in the State of Connecticut, from June 1, 1889, to December 31, 1889, inclusive. * * *

Will you please inform me whether you can undertake to have this work done for the Census. * * *

It is desirable that the work should commence immediately for the records of all deaths occurring from June 1 to December 31, 1889, inclusive. I presume that these records, at all events, will soon be forwarded to your office and will be available for work. I should also be glad to be informed as to the time at which you could have the records from January 1, 1890, to May 31, 1890, in your office and copied. If there will be any considerable delay in obtaining these last returns at your office I shall be obliged to have them copied from the local records by the enumerators on the 1st of June.

Please inform me as to how far you can undertake to have the work above referred to done for the Census Office, and how soon the copying of the records of death up to December 31, 1889, can be commenced.

Hoping for a favorable reply, I remain,

Yours very sincerely,

JOHN S. BILLINGS, *Surgeon U. S. A.,*

In charge Vital Statistics and Statistics of Cities, Eleventh Census.

In response to the foregoing letter it was

Voted, That the Secretary of the Board, in his official capacity as the Superintendent of Registration of Vital Statistics, be directed to respectfully request the Registrars of Vital Statistics in the several towns in the State to forward to his office at New Haven the certificates of all the deaths which have occurred in their respective towns between the 1st day of June and the 31st day of December, 1889, inclusive; that they may be used temporarily for the purposes of the U. S. census. That after such use the Secretary shall promptly return them to the towns from which they were received.

The Secretary then submitted for the approval of the Board the following circular letter to the Registrars of the State, in which the foregoing vote is incorporated. The letter was approved.

To .....

Registrar of the Vital Statistics of .....

DEAR SIR:

At the regular quarterly meeting of State Board of Health held in Hartford, Jan. 24th, 1890, a communication from John S. Billings, Surgeon U. S. A., in charge of Vital Statistics and Statistics of Cities, Eleventh Census, was presented, of which the following are extracts:

"I have been authorized by the Superintendent of the Census, with the approval of the Hon. Secretary of the Interior, to have copied

upon printed schedules prepared for the purpose, the data relating to the records of death in the State of Connecticut, from June 1, 1889, to December 31, 1889, inclusive." * * Will you please inform me whether you can undertake to have this work done for the Census, either by clerks in your office, or by some person you may specially employ for that purpose.

"It is desirable that the work should commence immediately for the records of this period." * *

"I should also be glad to be informed as to the time at which you could have the records from Jan. 1, 1890, to May 31, 1890, in your office and copied."

In this attempt at greater accuracy on the part of the Census officials, the State Board felt that it should most heartily coöperate, believing too, that if it is successfully carried out, the result will show that the system of obtaining data of mortality for record, in Connecticut, is equal in efficiency to that adopted by any other State in the Union.

The Board unanimously passed the following vote: That the Secretary of the Board, in his official capacity, as the Superintendent of the Registration of Vital Statistics, be directed respectfully to request the Registrars of Vital Statistics in the several towns in the State, to forward to his office all the certificates of deaths occurring in their respective towns between the first day of June and the 31st day of December, 1889, to be used temporarily for the purposes of the United States Census. And that after such use the Secretary shall promptly return them to the towns from which they were received.

In accordance with the above vote, I hereby most respectfully ask, that you will forward by mail to my address at New Haven, carefully sealed, in the envelope which I herewith send you, the original certificates of the deaths in your town, which happened between the 1st day of June and the end of the year 1889.

And I also promise to use all reasonable diligence in taking copies of them, and will thereafter promptly return them to your office.

Very respectfully,

C. A. LINDSLEY, M.D.,

Sec'y and Supt. of Registration of Vital Statistics.

The committee appointed at the last meeting to confer with the managers of the Fairfield County Home made a report which was accepted and ordered on file.*

The Secretary made a report in behalf of the members who inspected the source of water supply for Litchfield, which was accepted and ordered on file.*

The Secretary made a report on the occurrence of Typhoid Fever in Yale College in October, 1889. Accepted and ordered on file.*

* This report as relating to matters occurring in 1889 was published in the annual for that year—pages 303-4-6.

Voted, To authorize the Secretary to procure 500 copies of the Proceedings of the 5th Annual Conference of State Boards of Health, held in Nashville, Tenn., May 19, 20, 1890.

Voted, To renew the subscription for *The Annals of Hygiene* on the same terms as last year.

In response to a suggestion made in the report of Secretary, on motion of Prof. Brewer, it was

Voted, That the Secretary be authorized to collect data regarding the recent and present epidemic of so-called "Influenza," the methods and expense of same to be entrusted to the discretion of the Secretary and President.

The Secretary submitted the blank form for the use of Registrars in making their annual abstract of records, and asked the approval of the Board of some changes from the previous form in use. It was unanimously approved.

Quarterly Report of the Secretary was then read and accepted.

No further business offering, the meeting adjourned *sine die.*

Attest: C. A. Lindsley,
Secretary.

Secretary's Report

For Quarter ending December 31st, 1889.

In regard to the general health of the State, during the last quarter of the year, there has been nothing of any prominent significance to mention. The mortality was almost the same as that of the first quarter—exceeding it only by 8. While it was less than the third quarter of the year by 688.

As concerns the fatality from the chief infectious diseases, there have been some differences between 1889 and 1888 in the corresponding last quarters.

In 1889 there were reported 222 deaths from diphtheria and croup, against 187 in 1888.

From cerebro-spinal fever 30 deaths, againstonly 10 in the same quarter of the previous year.

From typhoid fever, however, the balance is on the other side, there having been only 72 against 126 of the year before.

From measles no death has been reported in the State since July.

Small-pox has again appeared. Two cases have been reported as occurring in the employees of the Seymour Paper Co., at

Windsor Locks. Both were women, working in the rag-room. Since the first report of these, several others have occurred, one or two at Warehouse Point.

The circulars of the Board, relating to small-pox, have been supplied to these towns, and the Secretary has had other correspondence with the health authorities of Windsor Locks.

A case of hydrophobia, fatal of course, occurred in a person in Jewett City, caused by the bite of a mad dog straying from Attleboro, Mass.

The most notable event, affecting the health of the State, is the epidemic of influenza, which is now so universally spread over the country, and which began almost simultaneously in every part of the State about a week before the close of the year.

The rapid spread of this epidemic to every community in the State, as well as elsewhere, suggests the question, whether the State Board ought not to take some action to acquire all the exact facts in regard to its natural history, as it now prevails among our citizens, which the opportunity affords. Whether some competent person should not be employed to make a full and careful report of it.

On the 1st of Dec., 1889, in obedience to the statute I forwarded to Gov. Bulkeley a printed copy of the Registration report for 1888, and a manuscript report, briefly presenting the work of the Board during the past year.

Respectfully submitted,

C. A. Lindsley, *Secretary.*

QUARTERLY MEETING.

Hartford, April 12, 1890.

The regular quarterly meeting of the State Board of Health was held this day, April 12th, at the State House, in Hartford.

The meeting was called to order at 2.30 p. m. The President being absent, the Hon. E. Johnson was chosen to preside.

There were present, beside the chairman, Prof. Wm. H. Brewer, Drs. Wilson, Goodwin and Lindsley, and soon after the Hon. A. E. Burr, who assumed the chair as the President of the Board.

The minutes of the last meeting were read and approved.

The Treasurer made his quarterly report, which was accepted.

The Secretary submitted a few letters, which were duly considered, but required no formal action.

The President, in explaining the absence of the venerable Dr. Butler, spoke of his failing health, and alluded, in feeling and fitting terms, to his long connection with the Board, the unwavering interest he had always manifested in it, and the important and valuable services he had rendered, and expressed the fear that he would never be able to be again present at its meetings.

The quarterly report of the Secretary was then read and accepted.

Dr. Lindsley was elected a delegate to the Conference of State Boards of Health, to be held in Nashville, Tenn., on the 19th and 20th of May next.

No further business offering, the meeting adjourned.

Attest, C. A. Lindsley, *Secretary.*

Secretary's Report

For Quarter ending March 31st, 1890.

As the chronicler of the current facts relating to the health of the State, it is the duty of the State Board to record a higher mortality than has ever before been reported in the corresponding quarter of the year. The total deaths were 3,833, being 850 more than the average mortality in the five years immediately preceding, and 990 more than the corresponding quarter of last year. Almost the whole of this excess occurred in January, during the prevalence of that remarkable pandemic, the "Influenza," or, as it was more commonly called, "La Grippe."

The deaths in January exceeded those in either February or March by more than 550.

Although, comparatively, very few deaths were ascribed directly to "La Grippe," a lethal impression was given to the subjects of all other grave diseases, which resulted in this unprecedented mortality during the brief period that that almost universal epidemic lasted.

The above fact was specially noticeable in regard to diseases of the lungs. The mortality in 1889, in January, from consumption, pneumonia and bronchitis combined, was only 283. While in January, 1890, from the same diseases the deaths numbered 694. No other explanation of this remarkable increase of mortality has been offered than, whereas it occurred during the height of the epidemic, some deadly influence was exerted upon the victims of lung diseases by its presence.

There has been no very marked increase of the so-called zymotic diseases during the quarter.

Measles has appeared again for the first time since July in a fatal form, but there were only 3 deaths against 13 in the first quarter of 1889.

Scarlet Fever had 22 deaths against 18 of the year before.

Cerebro-spinal Fever had 27 against 39 in 1889.

Diphtheria and Croup had 167 against 193 in 1889.

Whooping Cough, being a disease involving the respiratory organs, showed the influence of the epidemic by causing a mortality of 42 against only 23 in 1889, nearly double; Typhoid-malarial Fevers and Diarrhœal diseases did not vary materially in mortality from the corresponding quarter of a year ago. But the difference in diseases of the lungs was remarkable, as shown by the following comparative statement of the two periods :

1889.		1890.	
Consumption	362	Consumption	468
Pneumonia	337	Pneumonia	737
Bronchitis	94	Bronchitis	198

There was a marked difference in the fatality from diseases of the nervous system and of the heart.

1889.		1890.	
Nervous	319	Nervous	431
Heart	269	Heart	338

The influence which this wide-spread malady exerted upon other diseases, was not typical in the sense of developing any special symptoms which could be recognized as due to La Grippe, but its power seemed to be manifested chiefly as a depressing force—destroying the natural resistive powers of patients so that they fell ready victims to whatever disease might assault them, especially if it involved the pulmonary organs.

The epidemic of diphtheria at the Fairfield County Home has passed. The children are again returned to the house, and no new cases have occurred. Strenuous efforts are being made by the Commissioners to find a suitable site for the erection of a new home.

At the New Haven County Home located in the suburbs of the City of New Haven, an outbreak of Diphtheria occurred on the latter part of February, and is still existing. There are about 50 inmates of the building, and it is proposed to remove them all

out of their present home temporarily, so that the fullest opportunity can be had for a thorough disinfection.

Small-Pox, which started, as it so frequently does, from the rag department of a paper mill, reappeared, after an absence of many months from the State, at Windsor Locks. The first case discovered was in the person of an operative employed in the rag-room of the "Seymour Paper Company" at that place.

It was reported to the Health Board on the 26th of December, 1889. The patient, a woman, was promptly removed to an extemporized hospital two miles out of town, and other usual precautions taken. The next day another woman employed at the same place was taken down with the disease and cared for in like manner. Subsequently other cases occurred in the town, one or more of which were working in the same place. One man who was not previously known to have been a fool took the infection while riding home in the hack which had carried the small-pox patients to the hospital.

From this mill as a focus of infection the disease soon appeared in East Windsor, Woodstock, Waterbury, Meriden, and Bridgeport, resulting in 15 deaths. In all the towns except Meriden the disease was so controlled by the prompt and judicious precautions of the health authorities, that it was limited to the primary cases and not permitted to spread. Meriden, however, was the unfortunate possessor of a dual government, each having a board of health of its own, and each desirous of putting the honor of caring for the small-pox patients upon the other. So that after the disease was well recognized, precautionary measures were so delayed by such friendly rivalry between these two officially organized guardians of the public health, that the infection became widely spread, and resulted in the largest fatality in any year from small-pox, with one exception, since the establishment of the State Board of Health. The total mortality was fifteen, ten of which were in Meriden.

The exceptional year was in 1880, when small-pox was generally prevalent not only in this State but throughout the country.

It was not like the present epidemic, the outgrowth of a single focus of infection, but it was then the consequence of many importations of the disease in different parts of the State and at different times. It was present in every month of the year. Dr. Chamberlain, the late Secretary of the State Board, in the annual report of that date, says: "In several instances the disease was

introduced by servants brought up from New York, and usually emigrants that had been in this country but a little while. In one or two instances the contagion was charged to the rags used in paper stock, but there were not many cases at one time anywhere in the State. The disease appeared in a large number of places, and reappeared in some of the cities for the third time even." The above account of an invasion so wide-spread and frequent, illustrates, in a most practical and emphatic manner, the efficacy of the well-known precautions to prevent its spread, and proves that they can always be depended upon to control small-pox if used promptly and intelligently.

A fuller account of the Meriden epidemic will be found in another part of this volume, all of which is respectfully submitted.

C. A. LINDSLEY, *Secretary.*

QUARTERLY MEETING.

The quarterly meeting of the Connecticut State Board of Health was held July 9th, at the office of the Secretary, at New Haven.

The meeting was called to order at 2.30 P. M., by the President, Hon. A. E. Burr. There were present Prof. William H. Brewer, Drs. R. S. Goodwin, N. E. Wordin, and C. A. Lindsley. Dr. Wordin was introduced as a new member of the Board, having been recently appointed by Governor Bulkeley to fill the unexpired term of Dr. J. S. Butler, deceased.

The minutes of the last meeting were read and approved.

The Treasurer's report of the general expenses of the Board and the state of the treasury, was made; and also his report of the finances of the appropriation for the Investigation of the Pollution of Streams, all of which was accepted and ordered on file.

A communication from Mr. William Strong of Stratford, relating to a stagnant pond in a natural depression of the surface was presented by the Secretary. It was stated that said pond had become a nuisance in a sanitary sense to the growing population in the neighborhood, and the opinion of the State Board was asked, as to the powers of the local board, to order the owners of the property to abate it. After due consideration it was

Voted:—That it is the opinion of the State Board of Health, that local town boards of health have authority to order owners

of land to abate nuisances caused by stagnant ponds on their property.*

A communication from W. H. Childs, chairman of a committee on sewage in Manchester, was read by the Secretary, requesting the State Board to send an expert to confer with them on the many questions involved in sewering an inland town.

The Secretary reported that he had complied with the request by sending Prof. S. W. Williston, who had visited Manchester and had an interview with the parties interested and submitted the result in a written report, which he requested Prof. Williston to read to the Board.

It was voted:—That the action of the Secretary in employing Prof. Williston, be approved, and also the report upon the subject as presented by Prof. Williston.

A letter relating to the proposed discharge of the sewage of Torrington into the Naugatuck River was read, requesting the State Board to take such action, as was proper in the case. The reply of the Secretary was also read and approved.

Other letters were presented and their answers by the Secretary, all of which received the assent of the Board without special votes.

The Secretary reported an outbreak of Typhoid Fever in Waterbury, and that he had in company with Dr. Goodwin, a member of the Board, and Prof. Smith, visited Waterbury and Middlebury, the supposed source of the infection, and were so well persuaded that it was due to infected milk, at a dairy in Middlebury, that it was deemed best to employ Prof. Smith to make as full an investigation as possible. Prof. Smith being present made report of progress, stating his conviction that the Waterbury outbreak was due to infected milk from the dairy in Middlebury, but that he had not yet completed his inquiries.

The full report of the investigation will appear in the Annual Report of the Board.

* The above facts and action of the Board was submitted to Judge Johnson, the legal member of the Board, who was absent from the meeting on account of illness, and he wrote in reply as follows (C. A. L., Secretary):

"I fully concur in the action the Board has taken in the Stratford case, and believe that the local town board has jurisdiction in the matter." Signed,

ELISHA JOHNSON.

The Secretary announced that the valuable services of Prof. Williston would be no longer available to the Board, as he had accepted an invitation to a professor's chair in the University of Kansas.

The members of the Board expressed their regret at the prospective loss of one whose services had been so very valuable.

After some discussion as to who should undertake the duties heretofore performed by Prof. Williston, it was

Voted:—That the Secretary and Professor Brewer be a committee to employ such expert services as might be needed to perform the duties heretofore performed by Prof. Williston.

The quarterly report of the Secretary was then read and approved.

The Board then proceeded to the election of officers for the ensuing year, which resulted in choosing:

Hon. A. E. Burr, for *President.*

Dr. C. A. Lindsley, for *Treasurer.*

The Secretary announced the death of Dr. Butler since the last meeting, and said he had requested the President, Mr. Burr, to prepare suitable minutes of the sad event for record, and, in compliance therewith, Mr. Burr had submitted the following, which was unanimously approved and ordered to be printed with the next annual report of the Board:

In recording the death of Dr. John S. Butler, its first President, the State Board of Health desires to express its appreciation of his valuable services in perfecting its organization and bringing it to a standard of useful and efficient work. His knowledge of medical science and his success and long experience in his profession, eminently well fitted him to be a leader and counsellor in the discharge of the delicate and important duties which the State had imposed upon this Board. In his long and successful professional career, Dr. Butler accepted no theories of visionary, sentimental or inconsiderate persons who propose practices upon the human body not approved by the profession and facts of science; but his ready and cheerful aid was given to such advanced ideas in his profession as were proved of value by practical tests. Of a calm, thoughtful, and investigating nature, and ever willing to promote the welfare of his fellow-beings, Dr. Butler brought wise counsels to the consideration of important questions submitted to us; and he gave to this work, in behalf of the health of the State, a liberal share of his valuable time. We can do no more than to make this record upon our minutes of the profound sorrow felt by the members

of this Board at their loss, and to express to his family our sympathy in their bereavement.

No further business offering the meeting adjourned.

C. A. Lindsley, *Secretary.*

Secretary's Report.

For Quarter ending June 30th, 1890.

The Secretary is enabled to report, from the mortality statements of the registrars and the testimony of the sanitary correspondents, that the general health of the State has returned to about its usual condition.

The excessive mortality of the first quarter of the year, attributed to the baneful influences of the all-pervading epidemic, "La Grippe," has ceased. The deaths during the quarter represented an annual death rate of 16, against an annual death rate of 20.6 in the first quarter of the year, or a difference in the total of deaths amounting to 861.

The effects of the great epidemic, however, have been still active as manifested in the unusual mortality from diseases affecting the pulmonary organs.

The aggregate deaths from Consumption, Pneumonia and Bronchitis during the last quarter was just 100 more than occurred from those diseases in the corresponding quarter of the year before.

But the deaths from zymotic diseases were 64 less than in the same period of the previous year. The total deaths during the quarter were only 43 more than in the same time of 1889.

The Secretary would further report that he has been frequently called upon during the quarter for advice and information upon questions affecting the sanitary welfare of various localities about the State, and in regard to the restriction and control of local epidemics.

That he was requested to send an expert to consult with the authorities of Manchester in regard to the proper disposal of their sewage; and that in response, he had sent Prof. Williston, whose report on the subject will be published with the annual report of the Board.

He had also visited personally, by request of the Health Officer, the town of Stamford, to inspect the condition of the sewage-pumping works.

In response to a like invitation from the Wardens of Southington, he had visited that place to advise with them in regard to the construction of sewers, and more especially with reference to disposing of the sewage in the Quinnipiac river.

He visited the place on Thursday, June 5th, in company with Dr. Williston.

Mr. McKenzie, Civil Engineer, had made a survey of the locality, and had drawn a plan of contemplated sewers to discharge in the river. After examining the plan, we were taken over the proposed line of sewers.

There did not seem to be any engineering difficulty in the way of so disposing of the sewage by gravity. But it was stated to them that the pollution of the Quinnipiac by the sewage of Meriden, had been objected to by the citizens of Wallingford, and had already been considered by the Legislature, and further that the State Board of Health was on record before the Legislative committee as opposed to discharging the sewage of Meriden into the Quinnipiac river, and therefore could not consistently advise a like disposal of the sewage of Southington.

After discussing the alternatives, it was suggested that the Borough of Southington bring a petition to the next General Assembly, to grant an appropriation of dollars to make an initial undertaking in Connecticut of the disposal of sewage of small inland towns by land irrigation.

A tract of land in reasonable proximity to Southington was thought could be obtained at small cost, suitable for the purpose.

The Warden and Burgesses said they would have the necessary levels taken, to determine if it could be reached by gravity.

June 13, by request of Mr. Wm. S. Simmons, State Inspector of Factories, the Secretary went to Putnam to examine the Sanitary condition of the ——— ——— Company's mills, with special reference to the water-closets.

Found a six-story stone building employing several hundred operators of divers ages and sexes, including many children. The privy accommodations were adjacent to each workroom or floor, and communicated by an opening about the middle of one side into a wooden structure erected on the outer wall of the building, from the basement to the top floor, in dimensions, about 6 x 8 feet. In some of them the interior was divided for the use of the opposite sexes, although there was a common door of entrance.

The interior was wholly of wood, and under each seat was a wooden shute to the bottom, designed to carry the excreta into a large wooden box on wheels which received it, and which, when filled, was drawn out to be emptied.

These wooden shutes were saturated with the liquid filth to which they were so constantly exposed, and leakage from the upper closets and their appurtenances were quite apparent in the lower ones. The floors were also wet and soaked with the same. These long shutes apparently acted as chimneys, also, and a very perceptible current of air was drawn up through them, and into the closets and adjoining work rooms.

On the whole, the conditions were very bad, and in the opinion of your reporter, it was subjecting the numerous operators in that establishment to a very dangerous exposure.

The Secretary briefly reported his attendance as delegate to the 6th annual meeting of the National Conference of State Boards of Health, held at Nashville, May 19th and 20th.

The meeting was well attended and the many questions and subjects considered were discussed with spirit and mutual profit. The following topics in the programme of the work of the Conference gives an idea of the practical character of the discussions.

Subjects for Discussion.

The editing and printing of annual reports of State Boards of Health; and other methods of disseminating public health knowledge.

By what means can a proper comprehension of the principles and practice of hygiene be most effectually promoted?

Resolved, That upon the outbreak of yellow fever or other dangerous communicable disease rendering the establishment of quarantine necessary, this Conference urges such coöperation in administration on the part of threatened states as will confine the disease to the point of initial attack, in place of the expensive, unscientific, and unsatisfactory so-called quarantines at distant state lines.

Resolved, That this Conference urges upon the health authorities of each state the importance of such an administration of any quarantine they may establish as will furnish proper protection to, and show due regard for the rights of states lying beyond them.

What steps should the United States Government take to prevent the introduction of leprosy into this country?

To what extent is it necessary to moisten the air of rooms at the time sulphur is burned for the purpose of disinfection, after the occurrence of diphtheria, scarlet fever and small-pox?

Is it not both important and very desirable for all State Boards of Health to have a uniform system of blanks for the reports of vital statistics?

How to prevent contamination of potable waters.

Should State Boards of Health have executive powers?

Such special reports relating to work of the last quarter as are of public interest, or useful for general information will be published with the Annual Report of the Board.

All of which is respectfully submitted.

C. A. LINDSLEY, *Secretary.*

SPECIAL MEETING AT MERIDEN.

MERIDEN, CONN., JULY 31, 1890.

A special meeting of the State Board of Health was held this day at Meriden by request of the Mayor of the city to examine a proposed source of water to increase the public supply.

There were present on the part of the Board, Hon. A. E. Burr, Hon. E. Johnson, Prof. Wm. H. Brewer, Drs. G. H. Wilson, R. S. Goodwin, N. E. Wordin, and C. A. Lindsley, and Prof. S. W. Williston by invitation; and on the part of the City, Mayor Benj. Page, and Aldermen White, Evarts, Bradley and Twitchell.

The gentlemen convened at the Winthrop Hotel, and soon proceeded in carriages to Black Pond, at a distance of about three miles.

After a general survey of the premises and adjacent water-shed they returned to the Hotel, and the meeting was formally called to order by the President, Mr. Burr. Mayor Page made a statement of the need of a larger supply of water for Meriden, and of the size and depth of Black Pond, and of the advantages of affording its supply by gravity to the city.

Prof. Williston being called upon as an expert in water supplies, stated briefly the conditions which were essential to a good water and contrasted them with those existing at Black Pond.

Pres. Burr said that if other sources of supply were to be examined, it would be better to inspect them at an early day, and then make a written report on the whole subject.

The meeting accepted the suggestion, and adjourned to meet again on Monday, Aug. 4, at 11.45, at the same hotel.

C. A. LINDSLEY, *Secretary.*

ADJOURNED MEETING AT MERIDEN.

HARTFORD, CONN., August 4, 1890.

An adjourned meeting was held this day at Meriden at 12 M. to investigate further other proposed sources of water supply for that city.

There were present, on the part of the Board, President Burr, Professor Brewer, Dr. Wilson, Dr. Wordin ; and Dr. Williston by invitation. And on the part of the city authorities Mayor Page and Aldermen Evarts, White, and others.

After partaking of the hospitalities of the city at the Winthrop House, the party visited, in carriages provided, the "Crow Hollow" reservoir ; the present reservoir supplying the city ; a proposed site for a new reservoir to be constructed about a mile north of the present one; and still another reservoir still farther north of the city and known as the "Compensating Reservoir." After a careful inspection of these places, assisted by the engineer, Mr. McKenzie, the members of the Board assembled on the field and informally and briefly discussed the subject. It was at once apparent that great unanimity of opinion existed, and it was

Voted, That the Secretary and Professor Williston be requested to prepare a formal report expressing the opinions of the Board on the various proposed sources of supply, from a sanitary standpoint, and forward it to the Mayor of Meriden, at as early a period as convenient.—Adjourned.

Attest: C. A. LINDSLEY, *Secretary.*

SPECIAL MEETING AT NEW HAVEN.

NEW HAVEN, September 22d, 1890.

A special meeting of the Board was held this day at the office of the Secretary in New Haven, after due warning, to consider plans for the disposal of the sewage of the borough of Litchfield, to hear the reports of the engineers respecting a system of sewers, and to advise the burgesses of that borough on the subject.

In the absence of the President Dr. Wilson was chosen Chairman. Mr. McKenzie and Mr. Gray, Civil Engineers, were present to explain proposed methods of sewage disposal.

The members of the State Board were prepared to consider the subject intelligently, the majority of them having visited Litch-

field on the 10th and 11th of September and inspected the whole route of the proposed line of sewers and the fields upon which the disposal by irrigation was intended.

Mr. Gray of Providence presented a written report of the proposed plans with estimates of cost.

A full discussion followed of the various methods of sewage disposal, by irrigation—intermittent filtration and precipitation, and also by disposal without treatment of the discharge of the crude sewage into streams. After full consideration of the subject, resulting in entire agreement, it was

Voted—That the Secretary express, in a written report to the Burgesses of Litchfield, the opinions of the Board and its advice on this question.—Adjourned.

Attest : C. A. Lindsley, *Secretary.*

SPECIAL MEETING AT BRISTOL.

Hartford, Conn., October 4, 1890.

By invitation of the town authorities of Bristol, communicated through their Civil Engineer, Mr. McKenzie, the State Board met at the depot at Bristol on Saturday, October 4th, to confer with the above officials in regard to the disposal of the sewage of the village.

The present method of disposal is, in part, by cesspools and in part by discharge into the Pequabuck River.

Injunctions had been issued, or threatened, against the further discharge into the river and the authorities were considering a disposal by land irrigation.

Before deciding they desired the State Board to come and examine the plan proposed and advise about it.

There were present at the depot on the arrival of the train at 3.30 p. m, on the part of the Board, President Burr, Professor Brewer and Drs. Wilson, Goodwin, and Lindsley, and on the part of the town committee, Messrs. Hayward, Linstead, Winslow, Dunbar, and Dr. Hull, committee, and Engineer McKenzie.

The whole company proceeded, in carriages provided, to visit first the outlet of a sewer discharging into the Pequabuck river quite in the most thickly populated part of the village. They were also driven through other parts where disposal by cesspool or other means were practiced. Thence they were taken to the irri-

gation fields, some 3 miles from the village, to which it was proposed to convey the sewage by pipes, and dispose of it by broad irrigation upon the land.

An excavation had been made to the depths of several feet to determine the character of the soil.

Upon considering the subject after this inspection it was found the members of the Board were of one mind and the Secretary was directed to embody in a written report to the town authorities the opinions of the Board.—Adjourned.

Attest : C. A. LINDSLEY, *Secretary.*

QUARTERLY MEETING.

HARTFORD, Oct. 29th, 1890.

The quarterly meeting of the Board was held this day at the Capitol, after due warning. The meeting was called to order promptly at 2.30 P. M. The President being absent, Dr. R. S. Goodwin was chosen to preside. There were present Professor William H. Brewer, Hon. E. Johnson, Drs. G. H. Wilson, N. E. Wordin, and C. A. Lindsley.

The minutes of the last quarterly meeting were read and accepted, also the minutes of the meetings of the Board and the reports made to the authorities relating to the water supply at Meriden and the disposal of sewage at Litchfield, and at Bristol. At this point President Burr appeared and took the Chair. The Treasurer's report was presented and accepted. The quarterly report of the Secretary was read and accepted, and in response to a suggestion made in said report, a committee on legislation was appointed to consider and report to the Board such matters as may appear to be desirable to bring to the attention of the General Assembly in the interest of the public health.

The committee appointed consisted of the Secretary, Professor Brewer and Mr. Johnson.

The Committee of Investigation of Streams reported and read a report of progress by Professor Smith, which was as follows :

Professor C. A. LINDSLEY, *Secretary of the Connecticut State Board of Health.*

DEAR SIR :—In response to your request for a statement of the progress of the work on water, I would report as follows : The plan of procedure agreed upon by the committee, consisting of Professor Brewer and yourself, has been strictly adhered to. During the year ending on the

first of last August, samples were received each month from Hartford, New Britain, Middletown, Meriden, Norwich, Willimantic, Thomaston, Waterbury, Danbury, Stamford, and from Lakes Wintergreen and Whitney in New Haven—twelve stations in all. In these samples there has been determined the number of bacteria, the number of microscopic forms not bacteria, and the chemical composition. The data sought in the chemical analyses being color, turbidity, and sediment, solids in solution both total and volatile, chlorine, and nitrogen in the form of free ammonia, albuminoid ammonia, nitrites and nitrates.

In addition to these regular determinations a study of the methods of growth, etc., of many of the commoner forms of water bacteria was made by Dr. Foote under the direction of Dr. Lee. Determinations of the total organic nitrogen were also made in all of the samples. These were made for comparison with the amounts of albuminoid ammonia, and are of interest as there has been published as yet no such series of results obtained by the application to water analysis of the Kjeldahl method of nitrogen determination.

A rain gauge has also been kept at the laboratory and chemical analyses made of the rain collected during each month, as also of the rain or snow of several individual storms.

On August 1st, by your direction, the reservoirs at Danbury, Stamford and at Lake Wintergreen were dropped from the list and arrangements were made for the collection of samples at Bridgeport, Rockville and Lake Saltonstall in New Haven. The analytical data sought this year are the same as those of last year, except that albuminoid ammonia determinations are made in both filtered water, and the degree of hardness and the amount of oxygen consumed from permanganate are regularly determined in all samples. In addition to the examinations of the public water supplies, samples are taken each month from the Connecticut river at Warehouse Point, Rocky Hill and Goodspeed's Landing. The examinations are directed particularly toward determining the effect of sewage on the composition of the water with reference to its effect on the fishing industry.

No concise summary of all these analyses can now be made, but it is certain that the data will be of the greatest value in the future as showing the composition of the different classes of the purer or protected waters of Connecticut, and thus furnishing the means for estimating the degree of contamination of our streams, as well as the fitness for public use of sources from which it may be proposed to draw the supply of towns. Already we have been called upon several times to supply information for this latter purpose, as at Litchfield, Waterbury and Meriden.

Respectfully submitted,

HERBERT E. SMITH.

The committee appointed at the last meeting to employ such expert services as may be needed to perform the duties heretofore discharged by Professor Williston, reported that they had divided his duties and his salary between Professor Smith and

Dr. Lee, and have agreed with those gentlemen on the following terms: Professor Smith to receive a salary of $1,250 per annum from August 1st to July 1st following, and Dr. Lee $750 per annum for the same period.

Election of Health Officers.

Information having been received that the Board of Health of Hampton had failed to elect any officers, the State Board as by law provided elected H. H. Converse, M.D., to be health officer for the current year until the next annual election, at a salary of $50. Official notice having been given that the town of Redding had not elected a health officer, the State Board appointed Dr. Russell W. Lowe at a salary of $50.

The following communication was submitted from a committee of the Connecticut Medical Society:

Voted, That the State Board of Health be requested to coöperate with the medical profession of the State in procuring such legislation as will secure a registration of all the medical practitioners in the State, and such other proper legislation as will restrict the practice of medicine to persons qualified for such responsibilities.

The resolution was on motion laid upon the table until the next meeting. The following members were appointed delegates to the next meeting of the Amer. Pub. Health Assoc., to be held in Charleston, S. C., in December. To wit: the Secretary and the President, and Drs. Goodwin, Wilson, and Wordin. Adjourned.

C. A. Lindsley, *Secretary.*

Secretary's Report.

The general health of the State during the quarter ending October 1st, as indicated by the registered mortality, has been a fair average of that in the corresponding quarter for the preceding five years.

The chief causes of death during this quarter are always the intestinal diseases, of which Diarrhœa is the prominent symptom. During the last quarter there were registered 917 deaths from Diarrhœal diseases, while the average for the corresponding quarter in the three preceding years was 1001 from the same class of diseases.

There have been a few local epidemics—none of very wide extent or of great fatality. In Brooklyn an imported case of

Diphtheria gave rise to a number of other cases. And in Taftville near Norwich a more serious outbreak of the same disease occurred with several fatal results. Typhoid Fever has occurred, though mostly in a mild form, in many parts of the State. In that part of New Haven known as Grapevine Point, on the eastern side of the city a limited epidemic began in August, and was attributed to a foul well in the absence of other known cause.

I have had many letters during the quarter from health officers in different parts of the State asking information on sanitary questions, and for definite instructions as to their duties in special instances.

I have received notification from several registrars, that certain physicians, or sextons of cemeteries were not complying with the laws regarding registration, and I have in such instances written directly to the delinquent, sending a copy of the law, and respectfully requesting his observance of it. In every instance, I believe, the neglectful party has promptly complied with the requirements of the laws; and so far as I have means of knowing I feel justified in saying that the registration laws of the State were never more faithfully kept by physicians, clergymen, midwives and sextons, than at the present time.

I have, during the quarter, made official visits of inspection to several places of public resort and of public institutions, reports of which will appear in the annual report of the Board.

The Secretary would beg leave to suggest that a committee be appointed to consider what legislation it is desirable to bring to the attention of the next General Assembly in the interests of public health, and for the better registration of the Vital Statistics of the State.

It is deserving of consideration, whether there ought not to be a general law making it the duty of householders and physicians to notify health officers of towns whenever cases of infectious diseases occur. The practical results of this law when faithfully observed, are so effective in saving life and preventing sickness, that other argument in its favor would seem superfluous.

To consider what legislation is necessary when a local board of health shall neglect or refuse to cause the abatement of a dangerous nuisance.

To consider if public safety requires that the State Board of Health shall have more authority in executing sanitary law.

To consider if it should not be required by law that local boards of health should make an annual report to their towns, of which report copies should be sent to the State Board of Health. This reliable source of information, made available to the State Board, of the health and sanitary conditions of localities is a matter of such importance as to impress a sense of its value upon the intelligent mind without argument.

The Secretary is informed also that the committee appointed by the State Medical Society to obtain some legislation restricting unqualified practitioners of medicine, will solicit the aid of the State Board of Health in securing the passage of their proposed bill.

Other matters may arise which it may be necessary for us to consider in the discharge of a specific duty imposed upon us in our charter, to wit: to make such suggestions for further legislative action as we may deem proper for the better protection of life and health, and to recommend such forms and amendments of law as shall be deemed to be necessary for the thorough organization and efficiency of the registration of vital statistics throughout the State.

I, therefore, beg leave to submit whether it is not better to charge a committee with the duty of considering these points first before bringing them to the attention of the full board.

All of which is respectfully submitted.

C. A. Lindsley, *Secretary.*

A hasty retrospective glance at the events of the last year, indicates that it was a year of unusual activity and interest, in its dealings with the public health. It opened in the midst of that almost universal epidemic "Influenza," and is closing with very encouraging hopes that the great German scientist Koch has discovered a remedy for the most destructive disease to which mankind is subject—Tubercular Consumption. While each of these events have tended in their own way to excite the public interest, it is also true that the growing attention to public hygiene has been manifested during the year in much enlightened legislation having in view the improvement and protection of the public health.

Epidemics.

Besides "La Grippe," which struck our little State almost simultaneously with many other States and remote places, the people of Connecticut have not suffered any widespread or destructive pestilence.

The local epidemics within our borders have been, perhaps, as numerous as usual, yet with a wider experience and increased practice in the application of restrictive measures, they have, with a few exceptions, been confined to narrower limits and less fatal results than would have happened under the looser management of former times.

The most notable epidemics of the year were in Waterbury—one of Typhoid Fever, and in Meriden, one of Small Pox.

It is a signal illustration of the valuable results of scientific sanitation that, notwithstanding the continued prevalence of Cholera in Europe, and even in South America, it has not been permitted to gain a foothold in this country.

At the beginning of the year Cholera was prevalent in Mesopotamia and Persia. In the spring it spread to Turkey, but not severely. On the 13th of May it appeared in a small village in the province of Valencia in Spain, and in a month extended over the whole province; during the succeeding months it invaded five provinces, increasing in severity until September, when it began to decline, and at the end of the year seems to be disappearing. In some of the small towns of Spain it was so excessively fatal, that they were nearly depopulated. It was not allowed to invade other countries of western Europe, although it would easily have eluded the impotent means of restriction practiced in former times.

In southern Asia it spread in midsummer from Mesopotamia and Persia and was fearfully destructive to the Mohammedan devotees in their annual pilgrimage to Mecca. It was even more fatal among the Mussulmen than it was in Spain. A report made October 2 said that at that time there had been 33,863 cases reported, with 22,560 deaths in the Ottoman empire.

Spain has been afflicted also, during the year, with small-pox, out of proportion to its prevalence in other countries, although Holland and St. Petersburg have both suffered somewhat excessively. It is a most significant fact, illustrating the protective power of vaccination, that in all Ireland not a death occurred from small-pox between March, 1888, and Dec. 1st, 1890.—*Registrar General of Ireland.*

Yellow Fever has been, as usual, prevalent in Havana and other places in the West Indies, but the sanitary regulations instituted by our Government, and the watchful care observed by local and State Boards of Health has effectually excluded it from the United States.

Sanitary Legislation.

The Legislature of Connecticut not having been in session during the year, sanitary law-making has necessarily been limited to such regulations for the government of towns as local Boards of Health have adopted. In this respect, however, there has been marked and commendable progress. Over 30 towns in Connecticut are now subject to special sanitary regulations established by the local Health Boards.

But it concerns Connecticut in common with the other States to know that Congress has given so much attention to the interests of public health as to have enacted a law looking to the prevention of the spread of contagious diseases from one State to another.

The law is, in effect, that whenever the President of the United States shall be satisfied that Cholera, Yellow Fever, Small Pox, or Plague exists in any State or Territory, or in the District of Columbia, and that there is danger of the spread of such disease into other States or Territories, he may authorize the Secretary of the Treasury to promulgate such rules and regulations to prevent the spread of such disease as the Supervising Surgeon General of the Marine Hospital service shall prepare. And any person who shall wilfully violate any rule or regulation so made and promulgated, shall be guilty of a misdemeanor, and upon conviction shall be punished by a fine of not more than five hundred dollars, or imprisonment for not more than two years, or both, in the discretion of the court.

Congress has also enacted a law to prevent the adulteration of food and drugs. The Department of Agriculture is charged with the duty of analyzing suspected food and drugs, and all such found adulterated or misbranded shall, under penalty, be prevented from importation into any State from any other State or foreign country.

Congress apparently recognizing the great benefit which has been observed in England from the notification of contagious diseases, has passed an act for the District of Columbia requiring

the prompt notification and isolation of cases of Scarlet Fever and Diphtheria. This law is so admirable in its provisions that it is herewith published as a model for other municipalities.

Be it enacted by the Senate and House of Representatives of the United States of America, in Congress assembled, That from and after the passage of this act it shall be the duty of every registered practising physician or other person prescribing for the sick in the District of Columbia, to make a report to the health officer, on forms to be furnished by that officer, immediately after such practitioner becomes aware of the existence of any case of scarlet fever or diphtheria in his charge; and in case such person should fail to report within twenty-four hours he shall be subject to a penalty of not less than five nor more than fifty dollars, and in case of a second offense the penalty shall not be less than ten nor more than one hundred dollars. In case no physician shall be in charge of such patient, the house-holder where such case occurred, or person in charge thereof, the parent, guardian, nurse, or other person in attendance upon the sick person knowing the character of the disease, shall make the report above mentioned, and in case of failure to report shall suffer the same penalties as provided for physicians in this act.

SCE. 2. That it shall be the duty of the health officer coöperating with the attending physician, to cause a suitable placard, flag or warning sign to be displayed from the front of the premises or apartment where any one case of scarlet fever or diphtheria is present. It shall be unlawful for any person to remove such placard, sign or warning flag, when so placed, without permission of the health officer, and it shall be the duty of said health officer, in conjunction with the attending physician, to cause the premises to be properly disinfected, and to issue the necessary instructions for the isolation of the patient.

SEC. 3. That no person shall visit or attend any public or private school, or place of public assemblage, or appear on the public streets or in the parks while affected with scarlet fever or diphtheria, and any adult person, parent or guardian of a minor convicted of having knowingly violated the provisions of this act, shall, upon conviction, forfeit and pay a sum not less than five nor more than fifty dollars; and it shall be the duty of physicians while in attendance upon cases of scarlet fever or diphtheria, to exercise such reasonable precautions to prevent the spread of the said diseases as may be prescribed by the health officer of the District of Columbia in regulations.

SEC. 4. That no person who has convalesced from diphtheria or scarlet fever shall be allowed to attend any public or private school, seminary or college, until the attending physician shall have furnished a certificate that said patient has fully recovered, and that there is no danger of infection to other persons. All persons who shall, after convalescing from diphtheria or scarlet fever, visit schools, seminaries or colleges, without providing themselves with such certificates, shall suffer the penalties provided for in section one of this act.

SEC. 5. That the provisions of this act shall apply to every ship, vessel, steamer, boat or craft, lying or being in the rivers, harbors or other waters within the jurisdiction of said District, and to every tent, van, shed, hovel, barn, out-house, cabin, or other like place, as if the same were an ordinary dwelling.

SEC. 6. That the word "regulations" as herein used, shall be held to mean also rules, orders and amendments. The words "person in charge thereof" shall be held to mean the owner, his agent, or factor; the tenant, his clerk or representative; the nurse, or any one or more persons who by reason of their position are charged with the management or care of the premises, or interested in the person afflicted. The words "practitioner of medicine," or "practitioner" shall be held to include all persons who undertake to treat persons afflicted, either gratuitously or for pay.

SEC. 7. That any person who shall knowingly make, sign or deliver any false report or certificate herein provided for, upon conviction thereof in the police court of said District, shall be fined not less than five nor more than fifty dollars, and in default of payment thereof, be committed to jail for not less than one nor more than twenty days.

SEC. 8. That the expenses necessarily incurred in the execution of the provisions of this act, shall be borne from the general appropriation for the maintenance of the health department of the District of Columbia, and the jurisdiction of civil and criminal procedure in the enforcement of this act, is hereby vested in the police court of the said District, with the same right of appeal as in other civil and criminal trials in said District.

The Legislature of New York State has enacted several laws of sanitary interest. One provides that all the pauper and indigent insane in all the counties of the State, except New York, Kings and Monroe, shall be cared for and maintained by the State. The number to whom this law will apply is a little less than 2,300.

The following Anti-Smoking law went into effect in New York State on the 1st day of September, 1890: "No child actually *or apparently* under sixteen years of age, shall smoke, or in any way use any cigar, cigarette, or tobacco, in any form whatsoever, in any public place."

And on the same date the following law: "Should any midwife or nurse having charge of an infant in this State, notice that one or both eyes of such infant are inflamed or reddened at any time within two weeks after its birth, it shall be the duty, under penalty, of such midwife or nurse, so having charge of such infant, to report the fact in writing within six hours to the nearest health officer, or some legally qualified practitioner of

medicine, of the city, town, or district in which the parents of the infant reside."

Medical Practice Legislation.

The freedom permitted in this country to every person to pursue, without embarrassing restrictions, almost any occupation which he may choose, has tempted many persons not qualified by previous education or training to undertake the practice of medicine.

This temptation has been made stronger by the facilities available in various ways by which persons with but a very slender stock of medical science can obtain a diploma falsely certifying to their scientific acquirements and skill, and with the diploma the title of M.D.

On this account, so many persons who are in no adequate measure properly qualified, have recklessly assumed the duties and grave responsibilities of caring for the health and lives of their fellow citizens in sickness, that they have not only lowered the standard of professional skill, brought the profession of medicine into popular disrepute, given a commercial and trade character to its pursuit, but they have become a serious source of danger to the public health.

The evil has been justly appreciated by the people of most of the States and Territories of the Union, more particularly in the West. The Legislatures of these States and Territories have passed laws limiting the practice of medicine to such persons only as can give satisfactory evidence of reasonable attainments in medical knowledge; and prohibiting, under severe penalties, other persons from assuming functions involving such high responsibilities.

As one State after another have expelled these mountebanks and medical imposters from their borders, the result has been that other States, not protected by such laws, are more crowded with them, and in self-defence they are asking for similar legislation. Connecticut is among these and the incoming Legislature will be asked to enact a "Medical Practice Act," which will give its citizens some protection from this danger to which they are now so much exposed.

Of the States and Territories of the Union, forty-two, including the District of Columbia, have enacted laws more or less

effectual in their operation. Of these 37 are States and 4 are Territories. Only eight, of which Connecticut is one, have no legislation controlling the practice of medicine. The remaining seven, which have no laws restricting the practice of quackery, are Maine, Massachusetts, Rhode Island, North Dakota and South Dakota of the States, and Alaska and Utah of the Territories.

It is strongly significant of the importance and magnitude of this important evil that, not only in the United States, but throughout the civilized world there is an almost universal attempt to suppress it by direct legislation, imposing severe penalties upon offenders.

During the past year New Jersey has passed an amended practice Act, more stringent than former laws, and requiring all persons coming into that State to practice medicine, to pass an examination before a State Board of examiners before they can be licensed.

This Examining Board has nine members, consisting of five Physicians, three Homœopathic physicians and one Eclectic, and makes ineligible to membership of the Board the member of any college or university having a medical department.

This law is so strict that New York and Philadelphia physicians, however eminent, are disqualified from practicing in New Jersey until they have been examined and licensed.

The new State of Washington has passed a medical practice act within the year. The Examining Board of that State consists of nine members, of whom four are Physicians, three are Homœopathic physicians, one a Physio-medic and one an Eclectic. The "Physio-medic" is probably the result of Western evolution. He is not as yet a familiar acquaintance in Connecticut.

A bill has been introduced into the Senate of the United States establishing a board of medical examiners for the District of Columbia, which shall prescribe rules and regulations for the examination of all candidates presenting themselves, and prohibiting such candidates from practicing medicine until they have passed a satisfactory examination and been registered.

The above were the Medical Practice Acts passed during the year 1890.

The Tenth International Medical Congress.

The Triennial International Congress was held in Berlin during the past summer.

This was an event of most notable importance in the medical world. Over 5,000 members were in attendance, 683 being from the United States and Canada.

The congress was most satisfactory and successful. The paper which excited the most interest was that of Koch's announcing what he had done and what he hoped to do in regard to the treatment of tuberculosis.

Dr. Koch, it is said, presented this paper against his will. He regarded it as premature, and would have preferred to wait until further investigation would enable him to speak more positively.

Dr. Koch, some two months after, in view of the exaggerated and very erroneous statements which were being made and the false impression thereby formed, felt called upon to publish a brief review of the subject in its present stage.

He has not yet announced the origin or preparation of the remedy, but is withholding it for purely scientific reasons.

In February last a Pasteur Institute was opened in New York, under the Direction of Dr. Paul Gibier, for preventive inoccula-tion for Hydrophobia.

During the first eight months he treated 130 patients who had been bitten by rabid animals, and all are reported doing well.

The above are a few of the principal events and doings of the past year, which are of interest in their relation to public health.

A. E. BURR, *President.*
C. A. LINDSLEY, *Secretary.*
W. H. BREWER.
G. H. WILSON.
E. JOHNSON.
R. S. GOODWIN.
N. E. WORDIN.

THE HEALTH OF TOWNS.

Health of Towns.

The following statement in regard to the health of the towns of Connecticut is compiled as usual from the only reliable sources of information, the practising physicians, residents in said towns.

This information is rendered upon request of the Secretary of the State Board in response to a circular of interrogatories which the secretary sent to one physician resident or practising in each town in the State.

The State Board here desires to express its thanks to the correspondents who have so freely and gratuitously given these much desired facts.

This is the seventh series of reports relating to the health of the separate towns. It is to be regretted that all the towns are not represented by a respondent. The number every year, however, increases, and those which have answered are so widely distributed throughout the whole State that a very satisfactory and full idea of the general health and the character of the prevailing diseases is afforded.

The following are the questions propounded to the sanitary correspondents. Abstracts from the replies to these form the substance of the report :

QUESTIONS RELATING TO THE TOWN OF ——

1. Diseases specially prevalent? Are the Causes known and removable? Please state additional particulars of interest.

2. Rare or Strange Diseases?

3. Has Typhoid Fever been unusually prevalent? In what months most prevalent? Has it been traced in any instance to a special source? Is disinfection of Excreta of Typhoid patients insisted upon by the physicians in your vicinity?

4. Extent and prevailing type of Scarlet Fever? Are isolation and disinfection usually practiced with Scarlet Fever patients?

5. Extent and prevailing type of Measles? Restrictive precautions?

6. Diphtheria. Extent and type? Proportion of deaths? Are isolation and disinfection practiced? Can you give any facts relating to its beginning and mode of spreading? General sanitary condition of houses infected with diphtheria?

7. Have Malarial Diseases prevailed more than in 1889, or less? If at all, what is their general character?

8. What is the Water Supply of your town? Is the Water Supply good? In all months of the year?

9. Sewage Disposal?

10. What of the Drainage?

11. In general, what is the sanitary condition of town as regards Water Supply, Sewage Disposal and Drainage? Good? Bad? or indifferent?

ABSTRACTS FROM THE REPORTS RECEIVED IN ANSWER TO THE ABOVE INQUIRIES.

These reports are arranged by counties, and the towns are in alphabetical order.

HARTFORD COUNTY.

Avon—R. W. E. Alcott, M.D.

Diseases specially prevalent—La Grippe, commencing in December, 1889, lasting as an epidemic during January, February and March, with a few cases during every month in the year.

Typhoid Fever—Not unusually prevalent; in September and October a few cases. Disinfection of excreta of typhoid patients is insisted upon by the physicians.

Scarlet Fever—Small number of cases. Only in two families to my knowledge. Isolation and disinfection are practised with scarlet fever patients as much as possible.

Measles—A few cases. Restrictive precautions.

Diphtheria—A few cases; brought into the family by a young man from New York.

Malarial Diseases—Less prevalent than in 1889. Mild form.

Water Supply—Wells and springs. Good in all months of the year.

Sewage Disposal—Cesspools; some running top of ground.

Drainage—Very good.

General Sanitary Condition of town as regards Water Supply, Sewage Disposal and Drainage—Some bad, but on the whole very good.

Berlin—R. E. Ensign, M.D.

Diseases specially prevalent—In the spring, "La Grippe." I don't know the cause. Here, as elsewhere, some cases were a long time in recovering from it.

Typhoid Fever—Has not prevailed to any extent. The one case I heard of was in September. He was a student of Wesleyan College, but I don't know that they attributed its source there ; he recovered.

Scarlet Fever—Very limited and mild. Isolation and disinfection are practiced with scarlet fever patients as far as it is practicable.

Measles—Very few cases. No restrictive precautions.

Diphtheria—Three deaths in town past year.

Proportion of deaths—I should think 20 per cent. Isolation and disinfection are not perfectly practiced.

General Sanitary Condition of houses infected with Diphtheria—Rather bad.

Malarial Diseases—Much less prevalent than in 1889. Mild.

Water Supply—Springs, wells and cisterns. Good in all months of the year.

Sewage Disposal—Mostly upon the ground.

Drainage—Good.

General Sanitary Condition of town—Fairly good.

Bloomfield—Henry Gray, M.D.

Diseases specially prevalent—None.

Typhoid Fever—Not unusually prevalent. Disinfection of excreta of typhoid patients is insisted upon by the physicians.

Scarlet Fever—None. Isolation and disinfection are practiced with scarlet fever patients.

Measles—No measles.

Diphtheria—Only two or three cases ; not very severe. No deaths. Isolation and disinfection are practiced. Not sufficient in extent to furnish reliable information as to its beginning and spreading.

Malarial Diseases—Less than in 1889. Mild.

Water Supply—From wells. Usually good. In summer surface water in many wells is sufficient to affect the taste.

Sewage Disposal—A common drain ; sometimes under ground, sometimes open, leading nowhere in particular.

Drainage—As the dwellings are scattered, no trouble usually arises except danger from contamination of wells.

General Sanitary Condition of town—Some good ; more indifferent.

BRISTOL—H. E. WAY, M.D.

Diseases specially prevalent—None ; perhaps I should say those disorders depending upon heat, cold and dampness.

Typhoid Fever—No ; such fever has been rare. Disinfection of excreta of typhoid fever patients is insisted upon by the physicians. I think even in cases not certain.

Scarlet Fever—Limited ; very mild. Isolation and disinfection are usually practiced with scarlet fever patients.

Measles—A few spasmodic cases. Mild in type ; isolated.

Diphtheria—But few cases, and mild in type. Isolation and disinfection are practiced. One of the cases, it was believed, could be traced to a cesspool.

General Sanitary Condition of houses infected with Diphtheria—Fair, except as mentioned.

Malarial Diseases—I should say less rather than more.

General Character—Fever and general indisposition.

Water Supply—Reservoir.

Is the Water Supply good?—Abundant. Not always equally agreeable to taste but no unhealthful character has been attributed to it.

Sewage Disposal—Into streams, cesspools, or upon the surface, thus with other sources of filth polluting the soil. I find an improvement in that respect even among the careless, and those diseases so much dependent upon filth and dampness, less common.

Drainage—Only drainage natural, which in localities is fair, in other localities perhaps bad ; the most favorable have clay bottom or sub-soil, hence retentive of moisture.

Sanitary Condition of town—Water supply indifferent, sewerage bad, drainage, none artificial, the natural not first-rate, neither very bad, if bad ; yet in localities it must be bad as the ground is low and of vegetable origin, muck.

Burlington—H. E. Way, M.D.

Diseases specially prevalent—Those depending upon cold and and wet. Catarrhal.

Typhoid Fever—I did not learn of but one or two cases.

Scarlet Fever—None.

Are isolation and disinfection usually practiced with Scarlet Fever patients?—I think so; most of the practice is by physicians out of the town.

Measles—None within a year.

Diphtheria—None. I think isolation and disinfection are practiced.

Malarial diseases—Not at all.

Water supply—Wells, mostly.

Canton—George F. Lewis, M.D.

Diseases specially prevalent—None since the influenza of the two past winters.

Typhoid fever—Only two cases during the year. Traced to faulty drainage. Disinfection of excreta of typhoid patients is insisted upon by the physicians.

Scarlet fever—None. Isolation and disinfection always practiced with scarlet fever patients.

Measles—None.

Diphtheria—Not any.

Water supply—From springs. The water supply is good in all months of the year.

Sewage disposal—To Farmington river. In general the sanitary condition of the town as regards water supply, sewage disposal and drainage is good.

East Granby—S. R. Burnap, M.D.

Diseases specially prevalent—There was no form of disease specially prevalent in East Granby during the past year.

Rare or strange diseases—None, except "La Grippe."

Typhoid fever—There were no cases at all.

Scarlet fever—There were no cases that I know of.

Measles—A few cases of measles early in the year mild in type. Restrictive precautions comprised isolation, but not disinfection.

Diphtheria—No cases. No deaths.

Malarial Diseases—Not at all.

Water supply—Wells and springs furnish the water. Good in all months of the year.

Sewage disposal—Upon the surface and in cesspools; more rarely through proper sewers, as is usually the case in a farming community.

Drainage—Generally good.

General sanitary condition—Good as to the water supply and drainage, indifferent as to sewage disposal.

East Windsor—H. O. Allen, M.D.

Diseases specially prevalent—None except La Grippe during the first months of the year. There have been many cases during the year which might be termed "colds" which were very persistent, lasting anywhere from one to two months, confining the patient to bed a portion of the time in some instances. These cases I have called influenza. Probably a sort of tail end of the grip.

Rare or strange diseases—Three cases of small-pox.

Typhoid fever—Very few cases in town this year. Disinfection of excreta of typhoid patients is insisted upon by the physicians.

Scarlet fever—None to my knowledge. Isolation and disinfection are usually practiced with scarlet fever patients.

Measles—No cases during the year so far as I know.

Diphtheria—Very little and of mild type. Isolation and disinfection are practiced as much as possible.

Malarial diseases—Less prevalent than in '89. General character, remittent. Have not seen a case of pure intermittent (chills and fever) this year.

Water supply—Wells, springs, cisterns. Good in all months of the year.

Sewage disposal—Mostly carted off and used as a fertilizer.

Drainage—In the greater portion of town it is good.

General sanitary condition of town—Good.

Enfield—R. Strickland, M.D.

Diseases specially prevalent—Pneumonia, bronchitis and Grippe, during winter and early spring months.

Typhoid Fever—A few cases in September and October. Disinfection of excreta of typhoid patients is insisted upon by the physicians.

Scarlet Fever—Very little ; mild type. Isolation always and disinfection occasionally practiced with scarlet fever patients.

Measles—A few cases only ; mild type. No restrictive precautions.

Diphtheria—Very little. Isolation and disinfection are practiced.

Malarial Diseases—Have prevailed less than in 1889.

Water Supply—The west part of the town by an excellent system of water works, the east part by wells and springs. Good in all months of the year.

Sewage Disposal—By public sewers, private house drains and cesspools.

Drainage—Generally good.

General Sanitary Condition of town—Good.

Farmington—F. Wheeler, M.D.

Diseases specially prevalent—None.

Rare or Strange Diseases—The general prevalence of La Grippe. Many severe cases ; none fatal.

Typhoid Fever—Has not been unusually prevalent. In my solitary case, it undoubtedly had its origin in polluted drinking water, the well being in dangerous proximity to the privy and sink drain.

Scarlet Fever—None. Isolation and disinfection are usually practiced with scarlet fever patients.

Measles—None.

Diphtheria—None.

Malarial Diseases—Have prevailed less than in 1889.

Water Supply—From wells and springs. Good in all months in the year.

Sewage Disposal—In privies and cesspools.

General Sanitary Condition of town—Water supply good ; sewage disposal both bad and indifferent.

Glastonbury—Julius E. Griswold, M.D.

Diseases specially prevalent—The ordinary diseases.

Typhoid Fever—Typhoid symptoms in malarial cases have increased. Disinfection of excreta of typhoid patients is insisted upon by the physicians, so far as I know.

Scarlet Fever—Have known of no cases. Isolation and disinfection are usually practiced with scarlet fever patients, so far as I know.

Measles—A few mild cases. Restricted as far as possible.

Diphtheria—Has not prevailed extensively as year before. Mild type usually. Isolation and disinfection are practiced. It seems to spring up in certain localities from no cause that we can discover.

General Sanitary Condition of houses infected with diphtheria—As good as can be under the circumstances.

Malarial Diseases—Rather less prevalent than in 1889. Occurs in all forms one could imagine.

Water Supply—Wells. Good, usually, in all months of the year, so far as I know.

Sewage Disposal—Top of ground, mostly.

Drainage—No system of drainage.

General Sanitary Condition of town—Good, generally. Perhaps it would be better in some localities but whether we would have less sickness or not, I cannot feel sure.

Glastonbury (*South*)—H. M. Rising, M.D.

Diseases specially prevalent—About the usual ones, perhaps more coughs.

Typhoid Fever—More than any year for 15 ; most prevalent in September and October. The typhoid fever is different from that we had twenty years ago in that we have not so much trouble with the bowels. Disinfection of excreta of typhoid patients is, I think, insisted upon by the physicians.

Scarlet Fever—A few cases this fall beginning in the same place as last year but not so severe. Isolation and disinfection are usually practiced with scarlet fever patients.

Measles—More extensive as to territory and scattered over the greater part of the year, and not very severe. Isolation.

Diphtheria—A few cases this fall, beginning in same place as last year, but not so severe. None at this end of town. Isolation and disinfection are practiced. It began in the same school house as last year.

Sanitary Condition of houses infected with diphtheria—Bad sink drainage and water closets too near the house.

Malarial Diseases—About the same or less.

General Character—Nervous depression and neuralgia.

Water Supply—Mostly wells. Good in all months of the year.

Sewage Disposal—Surface mostly.

Drainage—Surface.

General Sanitary Condition of town—Indifferent.

Granby—W. A. Stratton, M.D.

Diseases specially prevalent—La Grippe, January. Measles, March.

Rare or Strange Diseases—La Grippe.

Typhoid Fever—Not unusually prevalent. Some during September and October. Disinfection of excreta of typhoid patients is insisted upon by the physicians.

Scarlet Fever—Only one case, mild. Isolation and disinfection are usually practiced with scarlet fever patients.

Measles—Prevalent during March in West Granby. Some cases very severe, usually mild.

Restrictive Precautions—Isolation.

Diphtheria—None.

Malarial Diseases—Have prevailed less than in 1889.

General Character—Remittent.

Water Supply—Wells and springs, except Granby St., which is supplied through iron pipes from brook; good in all months of the year.

Sewage Disposal—Cesspools and draining.

Drainage—Not very extra.

General Sanitary Condition of town—Indifferent.

Hartford—James Campbell, M.D.

Diseases Specially prevalent—La Grippe early in the year. General amount of spring, summer and autumn diseases. Generally mild in type. No epidemic since La Grippe. From April on our city has been what would be called healthy—the death rate compares favorably with preceding years.

Typhoid Fever—Not as prevalent as last fall. Most prevalent during October and November of 1889 and October of 1890. Has not been traced in any instance to a special source. Disinfection of excreta of typhoid patients is insisted upon by the physicians so far as I am informed.

Scarlet Fever—A moderate number of cases. Not of severe type usually. Isolation and disinfection are usually practiced.

Measles—Light.

Diphtheria—Occasional cases, some severe. Isolation and disinfection are practiced.

General Sanitary Condition of Houses infected with Diphtheria—Good, bad and indifferent.

Malarial Diseases—Somewhat less prevalent, I should say.

General Character—Sub acute.

Water Supply—Ponded, in all months of the year.

Sewage Disposal—Connecticut River.

Drainage—Much of it is good. There is, however, room for improvement, as is the case in most of our old towns and cities.

General Sanitary Condition of town—In general it is good, though some of the older sections of the town need to be redrained by deeper and larger sewers.

Manchester (*South*)—J. N. Parker, M.D.

Diseases specially prevalent—Intermittent, Remittent and severe Typhoid Fevers.

Typhoid Fever—Not unusually so, but most prevalent in September and October. In the south part of the village, in a radius of a few rods, there occurred nine or ten cases of typhoid fever (mostly mild) only two deaths, and the cause seemed a little mysterious. The water came mostly from two wells, or perhaps I should say three wells, and the reservoir that supplies the village. The water was examined and found all right. The river supply nothing could be said against, and where the trouble really was I could not decide. Disinfection of excreta of typhoid patients is not at all times insisted upon by the physicians.

Scarlet Fever—Few mild cases. Isolation and disinfection are not always practiced with scarlet fever patients.

Measles—Few mild cases.

Restrictive Precautions—Kept at home.

Diphtheria—Very few mild cases. Isolation and disinfection are practiced.

General Sanitary Condition of Houses infected with Diphtheria—Usually as good, as far as can be seen, as those that do not have it.

Malarial Diseases—I should say less prevalent than in 1889.

General Character—Mild type.

Water Supply—Reservoir about one mile south of village, and another reservoir in course of construction. Most excellent, ample and good in all months of the year.

Sewage Disposal—Partly by pipe, and partly natural into a stream running through the village.

Drainage—Good.

General Sanitary Condition of town—Good.

New Britain—B. N. Comings, M.D.

Diseases Specially prevalent—La Grippe, bronchitis, pneumonia. The primary active stage of the grippe was limited chiefly to the month of January. The secondary effects continued more or less through the spring and summer. In fatal cases it usually assumed the form of bronchitis, or pneumonia, with a tendency to chronic bronchitis or phthisis.

Rare or Strange Diseases—None except "La Grippe."

Typhoid Fever—A few cases in September and October. Disinfection of excreta of typhoid patients is insisted upon by the physicians.

Scarlet Fever—Mild and not extensive. Isolation and disinfection are usually practiced with scarlet fever patients.

Measles—Mild and not numerous cases.

Diphtheria—Prevailed to a limited extent and not malignant.

Proportion of Deaths—Small.

General Sanitary Condition of houses infected with Diphtheria—Almost always bad.

Malarial Diseases—About the same as in 1889. Mild in character.

Water Supply—Shuttle Meadow Lake. Good in all months of the year, except July, August and September.

Sewage Disposal—By sewers.

Drainage—Very good for most of the city.

General Sanitary Condition of town—Good.

Newington—Louis V. Durand, M.D.

Diseases specially prevalent—Catarrhal and gastric—supposed to be atmospheric. We have had a number of cases of Influenza this summer and fall similar to that of last year.

Typhoid Fever—About as usual. Most prevalent in September and October. Not definitely traced in any instance to a special

source. Disinfection of excreta of typhoid patients is insisted upon by the physicians.

Scarlet Fever—None. Isolation and disinfection are usually practiced with scarlet fever patients.

Measles—There were a number of cases in spring of a mild form. Isolation and disinfection were practiced.

Diphtheria—Two cases, malignant type. No deaths. Isolation and disinfection are practiced. The disease did not spread but was confined to the house in which it originated, nor was there but one case in each house. In one case the patient had just returned from the South, where he had been spending the winter. The other case the patient had been working by the side of a boy whose sister had a severe attack of the disease.

Malarial Diseases—Have prevailed less than in 1889. General character more of a remitting type.

Water Supply—From reservoirs, wells, and springs, good as a rule, in all months of the year.

Sewage Disposal—Cesspools, earth closets and ordinary vaults.

Drainage—For the most part, good.

General Sanitary Condition of town—Indifferent.

Plainville—J. N. Bull, M.D.

Diseases specially prevalent—None.

Typhoid Fever—I have not known of a case.

Scarlet Fever—More than in previous year. Medium severity. Isolation and disinfection are practiced with scarlet fever patients by myself.

Measles—None.

Diphtheria—Some mild cases. Only one malignant case.

Proportion of deaths—Small. Isolation and disinfection are practiced.

Sanitary condition of houses infected with diphtheria—All conditions.

Malarial diseases—About the same. No intermittent. Remittent of several weeks' duration.

Water Supply—Reservoir and wells. Good in all months of the year.

Sewage disposal—Have no system.

Drainage—Indifferent. No system.

General Sanitary Condition of town—Indifferent.

Rocky Hill—Rufus W. Griswold, M.D.

Diseases specially prevalent—None.

Typhoid Fever—Scarcely any. Disinfection of excreta of typhoid patients usually buried in earth-holes.

Scarlet Fever—Not any. Isolation and disinfection are usually practiced with scarlet fever patients.

Measles—Not any.

Diphtheria—Hardly any for the year. No bad cases. Isolation and disinfection are practiced.

Malarial diseases—Rather less prevalent than in '89.

General character—Irregular in type.

Water supply—Old-fashioned wells.

Sewage Disposal—Mostly drained off on the surface.

Drainage—Surface. Natural, but very good, all over town. Land is rolling and drains off well.

General Sanitary Condition of town—Good.

Simsbury—C. M. Wooster, M.D.

Diseases specially prevalent—None. With the exception of La Grippe and its results there has been less sickness from all causes during the past year.

Typhoid Fever—There has been less typhoid fever for the past year than for ten years, the few cases having run a mild but regular and well marked course without complications, mostly in September and October, and could not be traced to any special source. Disinfection of excreta is strictly insisted upon.

Scarlet Fever—Only one case, from out of town. Isolation is insisted upon in all cases with exception of members of family.

Measles—An epidemic of measles (twenty cases), and German measles (thirty cases) occuring in and about the village of Tariffville in the month of March, in which the disease was in many cases of a severe type.

Diphtheria—Only two cases and those of a malignant type, with one death. The sanitary condition of the house was bad, and as both cases occurred in the same family the cause was assigned to that condition. Isolation and disinfection was practiced and there was no spread of the disease.

Malarial Diseases—Have been less than in 1889 and their type less marked. Mostly remittent in character.

Water Supply—The village is supplied with reservoir water, but well water is mostly used for drinking purposes, and the supply of both is good the entire year.

Sewage Disposal—By ordinary sink drains and cesspools. The majority are very inattentive to their proper construction and care.

Drainage—Good naturally.

General Sanitary Condition of town—Bad, but improving.

Southington—W. G. Steadman, M.D.

Diseases specially prevalent—None.

Typhoid Fever—Not unusually prevalent, a few cases in the fall. Disinfection of excreta of typhoid patients is insisted upon by myself. Whether all the others do or not I cannot say.

Scarlet Fever—None.

Measles—None.

Diphtheria—Very little if any. Mild.

Are isolation and disinfection practiced?—No.

Malarial Diseases—Very litle. I have not seen a typical case of malarial fever for a year, and very few that had anything like malarial symptoms incidentally.

Water Supply—Brought from brook on Wolcott Mountain, not from Waterbury reservoir. Good in all months of the year.

Sewage Disposal—Cesspools, open drains.

Drainage—Poor. There are a few short sewers leading into low places or swamps, used mostly to carry off rain-fall.

General Sanitary Condition of town—Water supply good. Sewage disposal and drainage bad.

South Windsor—Charles L. Blakeslee, M.D.

Diseases specially prevalent—None except "La Grippe."

Rare or strange diseases—One case of pseudo-leucocythæmia.

Typhoid Fever—Have not seen or heard of a case.

Scarlet Fever—There have been no cases.

Measles—There has been an epidemic mild in type. I judge there were no restrictive precautions.

Diphtheria—A few cases of a mild type. No deaths. Isolation and disinfection are practiced. They have been sporadic.

Malarial Diseases—Have prevailed to about the same extent as in '89. The general character is that due to chronic malarial infection with a few cases of chills and fever.

Water Supply—From wells and springs. Good in all months of the year.

Drainage—Through brooks and ditches.

Suffield—J. K. Mason, A.M., M.D.

Diseases specially prevalent—La Grippe, bronchitis, bowel complaints. Causes, epidemic, atmospheric.

Typhoid Fever—Only three or four cases in October and November. Three cases in one house where several cases have occurred in former years. Owing to location sanitary conditions not good. Disinfection was practiced in these cases. Disinfection of excreta of typhoid patients is recommended, but not generally insisted on, I think.

Scarlet Fever—None.

Are isolation and disinfection usually practiced with scarlet fever patients?—In a case last year it was, and will probably always be in the future.

Measles—None up to November 1st.

Diphtheria—None.

Malarial diseases—Have prevailed less than in 1889.

General character—Rarely distinct. Usually complicating other diseases.

Water Supply—Wells, springs and cisterns. Good in all months of the year.

Sewage Disposal—Principally cesspools.

Drainage—No public system.

General Sanitary Condition of town—Good.

Wethersfield—A. S. Warner, M.D.

Diseases especially prevalent—With the exception of the influenza (La Grippe) in January, no diseases were specially prevalent. Perhaps a somewhat local epidemic of measles should also be excepted.

(N. B. This has reference to sickness outside the State prison.)

Typhoid Fever—No cases.

Has it been traced in any instance to a special source?—A case which had its prodromic stage in the last days of October has at the present date (Nov. 9) proved to be typhoid fever.

Is disinfection of excreta of typhoid patients insisted upon by the physicians in your vicinity—Yes. (I only answer for myself. I think it is true of others.)

Scarlet Fever—I think there have been no cases.

Measles—Prevailed pretty generally in one school district; not much outside of that district.

Restrictive precautions—No, except what parents themselves exercise.

Diphtheria—Three cases; one death. Isolation and disinfection are practiced.

Can you give any facts relating to its beginning and mode of spreading? One contracted in April—one from this. Of the third I don't know.

Malarial Diseases—Have prevailed less than in 1889.

General character—Proportionally a larger number of irregular cases. Sometimes very persistent.

Water Supply—Chiefly wells. Good in all months of the year as a rule.

Sewage Disposal—Surface and cesspools.

Drainage—No public system. A considerable acreage of land is drained for agricultural improvement by the owners.

General Sanitary Condition of town—Good.

Windsor—Newton S. Bell, M.D.

Diseases specially prevalent—Influenza.

Typhoid Fever—No more prevalent than in former years. Disinfection of excreta of typhoid patients is always insisted upon by the physicians. Most prevalent in the months of August and September.

Scarlet Fever—Slight and mild. I think there were but three or four cases in town. Isolation and disinfection are usually practiced.

Measles—Some.

Diphtheria—During the months of March and April, diphtheria of a malignant type broke out in two families. In one family, out of five cases, there were three deaths. In the other family, three cases, but no deaths. The two families were in opposite parts of the town, and in both cases the disease was imported, the sanitary condition in both places being good. Isolation and thorough disinfection was insisted upon.

Malarial Diseases—Less prevalent than in 1889.

Water Supply—Good.

Sewage Disposal—Not what it should be.
Drainage—Fairly good.
General Sanitary Condition of town—Good.

WINDSOR LOCKS—S. R. BURNAP, M.D.

Diseases specially prevalent—Measles, whooping cough and Grippe are the only diseases that have been especially prevalent since my last report. The first named disease is still prevalent and has caused two deaths in young and neglected children. One child has died of whooping cough, and some mortality has attended the Grippe, which, for a time, made business lively for doctors all through this region.

Rare or strange diseases—La Grippe and small-pox might be mentioned under the head of the latter—there were two cases: one fatal; also four or five cases of varioloid.

Typhoid Fever—I have not seen, and do not remember to have heard of a case, in this town, during the past year. Disinfection of excreta of typhoid patients is not generally insisted upon by the physicians in our vicinity.

Scarlet Fever—There has been no scarlet fever during the past year that I am aware of. Isolation and disinfection are not usually practiced with as much thoroughness, I fear, as they should be.

Measles—A large number of cases—I can not say how many—have occurred, generally of a mild type. The two young children who died of the disease were imprudently exposed, and neglected, and had, in consequence as I learn, some pulmonary complication which caused death.

Diphtheria—No cases.

Malarial diseases—Very little. No new cases.

Water supply—Good as can be, from a pure source, remote from the village; but all do not use it; this supply good in all months of the year. Wells, in dry seasons, are very bad.

Sewage disposal—Of this there is all kinds, still; but, on the whole, there has been a great improvement during the past few years.

Drainage—The surface drainage of the place is, for the most part, good; but there is only a very imperfect system of underground sewers.

General Sanitary Condition of town—Water supply, good. Sewage disposal, bad; Drainage, good.

NEW HAVEN COUNTY.

Beacon Falls—F. B. Tuttle, M.D.

Diseases specially prevalent—None prevalent. Few cases of scarlet fever.

Typhoid Fever—Not a case in town during the year. Disinfection of excreta of typhoid patients is insisted upon by the physicians.

Scarlet Fever—A few mild cases. Isolation and disinfection are usually practiced with scarlet fever patients.

Measles—None.

Diphtheria—A few mild cases; no deaths. Isolation and disinfection are practiced.

General Sanitary Condition of houses infected with Diphtheria—Bad, from cesspools.

Malarial Diseases—Have prevailed more than in 1889.

General Character—Slight remittent fever.

Water Supply—Wells. Fair in all months of the year.

Sewage Disposal—Cesspools and top of ground.

Drainage—Poor.

General Sanitary Condition of town—Indifferent.

Branford—C. W. Gaylord, M.D.

Diseases specially prevalent—Except influenza none, unless it be affections of throat and upper air passages.

Causes—Mainly atmospheric, and negligence and carelessness on part of people.

Influenza was prevalent here as everywhere, beginning the very last of December (first case from New York) and continuing during months of January and February, and was followed by somewhat more than the usual amount of pneumonia.

Whooping cough also quite prevalent during late spring and early summer.

Rare or Strange Diseases—None. (A child born, well developed in every way, but without trace of arms.)

Typhoid Fever—Not unusually prevalent. Most in September and October.

Has it been traced in any instance to a special source—In one case in my own practice. In a family consisting of 8 persons, 3

adults and 5 children (from 16 to 5 years of age)—the five children and one adult were taken sick with *Typhoid* fever during months of September and October. The adult aged 31 and the youngest child, aged 5, died. Cause pretty clearly traced to pollution of *well* from sink drain or cesspool, or both, on a neighbor's premises.

Is disinfection of excreta of typhoid patients insisted upon by the physicians in your vicinity? Can answer with positiveness for myself only. Always insist on disinfection and immediate burial.

Scarlet Fever—None. Isolation and disinfection are usually practiced with scarlet fever patients.

Measles—I think none.

Diphtheria—A few sporadic cases only. Some of virulent type. Isolation and disinfection attempted. Quite a number of cases of membranous croup. Large per cent. fatal.

General Sanitary Condition of houses infected with Diphtheria—Poor as a rule.

Malarial Diseases—Much the same.

General Character—Cases of intermittent fever not infrequent. Malarial or intermittent neuralgia quite common, and an intermittent character or a condition decidedly controlled by quinine quite noticeable in many affections.

Water Supply—Wells, cisterns and springs. Fair, except in dry seasons.

Sewage Disposal—Cesspools. Surface drains mainly.

Drainage—Mainly that provided by nature, which would be very fair were it not blocked and obstructed by devices of man.

General Sanitary Condition of town—Fair or indifferent.

Cheshire—M. N. Chamberlin, M.D.

Diseases specially prevalent—Influenza last winter.

Rare or Strange Diseases—Case of idiopathic glossitis, terminating in resolution and recovery.

Typhoid Fever—Not unusually prevalent. Disinfection of excreta of typhoid patients is, I think, insisted upon by the physicians.

Scarlet Fever—No cases. Isolation and disinfection are practiced to some extent with scarlet fever patients.

Measles—Very few, if any cases.

Diphtheria—Two or three mild cases in one family. No deaths.

General Sanitary Condition of house infected with diphtheria—Fair.

Malarial Diseases—About the same as in 1889.

General Character—Mild. One severe case in a young pregnant woman. Owing to excessive nausea was obliged to give the antiperiodic (Cinchonidia Sulphate) in enema. Recovery.

Water Supply—Mostly wells ; a very few from springs. Good except in very dry seasons.

Sewage Disposal—Generally surface, perhaps a few cesspools.

Drainage—Surface ; generally good.

General Sanitary Condition of town—Good.

Derby—Chas. H. Pinney, M.D.

Diseases specially prevalent—None.

Typhoid Fever—No cases.

Scarlet Fever—Very few cases and those very mild. Isolation and disinfection not usually practiced with scarlet fever patients.

Measles—Only one case and that imported.

Diphtheria—A few cases every month.

Proportion of deaths—Very small. Isolation and disinfection seldom practiced.

Can you give any facts relating to its beginning and mode of spreading?—Have seen only occasional cases in different portions of the town for two or three years.

General Sanitary Condition of houses infected with diphtheria—All conditions, from the most perfect to the very worst. As often in the most perfect.

Malarial Diseases—Less prevalent than in 1889.

General Character—Mild.

Water Supply—From artificial lakes and wells and springs. Good in all months of the year.

Sewage Disposal—Drained into the river below tide water.

Drainage—As perfect as in any town in the State.

General Sanitary Condition of town—Good.

East Haven—Walter A. Zink, M. D.

Diseases specially prevalent—Rheumatism, erysipelas.

Typhoid Fever—Not unusually prevalent.

Scarlet Fever—None. Isolation and disinfection are always practiced with scarlet fever patients.

Measles—None.

Diphtheria—None.

Malarial Diseases—About the same as in 1889.

General Character—Common type.

Water Supply—From wells. Good in all months of the year.

Sewage Disposal—Open method.

Drainage—Very good; natural.

General Sanitary Condition of town—Good.

Hamden—Edwin D. Swift, M.D.

Diseases specially prevalent—At present, none. The epidemic of last winter wrought much havoc, though in two cases, taenia, unsuspected, were dislodged and have not reappeared. Some of the survivors of the epidemic have not yet fully recovered. A second edition of it has prevailed somewhat extensively since August 20th, though greatly modified. A very few cases of typhoid fever have also existed.

Rare or Strange Diseases—Urethral hyperaesthesia, due probably to neuralgia.

Typhoid Fever—A few cases in June, July and August. No cause was found. Disinfection of excreta of typhoid patients is insisted upon by the physicians.

Scarlet Fever—Quite prevalent, though generally mild. Isolation and disinfection are usually practiced with scarlet fever patients, so far as I know.

Measles—None that I have known of.

Diphtheria—None that I have heard of.

Malarial Diseases—Have prevailed rather less than in 1889.

General Character—More of persistent neuralgia trouble.

Water Supply—Wells and springs. Good in all months of the year.

Sewage Disposal—No public sewers, every house being supplied with a privy.

Drainage—For the most part good. All the northern and most of the eastern portions of Hamden ultimately drain into Mill River.

General Sanitary Condition of town—Very good.

Madison—Daniel M. Webb, M.D.

Diseases specially prevalent—Bronchial and neuralgic troubles; atmospheric changes; neuralgic troubles have been quite prevalent here, since advent of La Grippe. Sometimes located in one part of the body, and suddenly affecting another part.

Typhoid Fever—None.

Scarlet Fever—None.

Measles—No measles.

Diphtheria—No diphtheria, as far as I know.

Malarial Diseases—About the same; usually in a masked form; a few cases of late with distinct chills, followed by fever and sweating.

Water Supply—Below par; not good in all months of the year.

Sewage Disposal—Far from what it ought to be.

Drainage—Nothing to brag of.

General Sanitary Condition of town—Indifferent.

Meriden—G. H. Wilson, M.D.

Diseases specially prevalent—Small-pox, diphtheria, scarlatina, at different seasons.

Are the Causes known and removable?—Yes.

Please state additional particulars of interest—Variola, through oversight, was allowed three crops. Diphtheria and scarlatina, only sporadic.

Typhoid Fever—A few cases in October. Has not been traced in any instance to a special source. Disinfection of excreta of typhoid patients is insisted upon by the physicians in some cases only.

Scarlet Fever—September and October about ten cases; some severe; most mild; none fatal, sporadic. Isolation and disinfection are practiced with scarlet fever patients. By the best physicians, but by many not.

Measles—None.

Diphtheria—September and October, 15 cases—2 fatal. Isolation and disinfection are practiced. Scattered. No infection.

General Sanitary Condition of houses infected with diphtheria—Good.

Malarial diseases—Probably less. Hardly any strictly periodical.

Water supply—Reservoir. Has been good this year.

Sewage disposal—Considerable drainage into Harbor Brook —a constant and rapidly-flowing stream.

Drainage—Perhaps one-third of the houses drain into streams.

General Sanitary Condition of town—Water supply good. Sewage disposal, though partial, have not suffered in any perceptible way—our death-rate having been exceptionally low.

Middlebury—Marcus DeForest, M.D.

Diseases specially prevalent—None, except bronchitis, pneumonia and all kindred diseases.

Typhoid Fever—Not unusually prevalent. Disinfection of excreta of typhoid patients is insisted upon by the physicians.

Scarlet Fever—Very rare. Isolation and disinfection are usually practiced with scarlet fever patients.

Measles — Almost every child, in due time, has measles, it usually being mild and uncomplicated.

Restrictive precautions—Not practiced much. In 35 years have not known a case of death from measles, except in one or two old people with complications. Older people, who have heretofore been "passed by" and who begin to dread it, shun the locality; young people and children generally expect they must have it, do not shun it, while the parents of some young children positively invite it, as desirable to be had and done with in childhood, when, in a very large percentage, it is so mild as to give no anxiety.

Diphtheria—A well marked case has not occurred in many years. Isolation and disinfection are practiced.

Malarial diseases—We have hardly any. Our hilly, airy region and swift currents and good water don't agree with it.

Water supply—Wells and springs, good in all months of the year.

Sewage disposal—None.

Drainage—Very few artificial drains, but have a good natural drainage away from the houses.

General Sanitary Condition of town—Good.

Milford—E. B. Heady, M.D.

Diseases specially prevalent—La Grippe, pneumonia, whooping cough, diphtheria, and typhoid fever.

Causes—In many cases, owing to bad drainage and sewage. The fatal and malignant cases of diphtheria were in people who contracted the disease in one or the other of the adjoining cities, and became sick soon after coming to Milford, except in one case, a family was visited here by a person who had the disease, and the whole family were severely sick.

Typhoid Fever—Only a few cases, in October. Has not been traced in any instance to a special source. Disinfection of excreta of typhoid patients is insisted upon by the physicians.

Scarlet Fever—None during the year. Isolation and disinfection are usually practiced.

Measles—No severe cases.

Diphtheria—Majority of cases, malignant type. Isolation and disinfection are practiced.

Mode of spreading—By contagion. Caused by a person visiting here who had diphtheria in the city.

General Sanitary Condition of houses infected with diphtheria—Fair.

Malarial diseases—Have prevailed more than in 1889.

General character—Malarial fever and typhoid-malaria, besides many cases of well-marked chills and fever.

Water supply—Wells, entirely. Water very bad, when the springs rise, carrying the contents of the cesspools into the wells.

Sewage disposal—Entirely by cesspools, or throwing upon the ground.

Drainage—No system of drainage in the village.

General Sanitary Condition of town—Bad. Many people here are very negligent regarding the sanitary condition of their dwellings often; a sink drain empties into a cesspool, without any vent, and the gas is forced back into the rooms of the house, causing disease and any number of bad feelings.

Naugatuck—F. B. Tuttle, M.D.

Diseases specially prevalent—No epidemic of diseases, except La Grippe. I have had a number of very severe cases of phlegmenous erysipelas.

Typhoid Fever—Most prevalent in September and October. Traced to impure water. Disinfection of excreta of typhoid patients is, I think, strictly insisted upon by the physicians.

Scarlet Fever—We have had fifteen or twenty cases. Mostly of a mild form; one malignant case, causing death. Isolation and disinfection are practiced with scarlet fever patients in every case.

Measles—I have not heard of a case in this town.

Diphtheria—Quite prevalent. Mostly mild. Isolation and disinfection are practiced. I think every case that I have seen or heard of in town has been caused by bad sanitary conditions.

Malarial diseases—About the same.

General character — Intermittent and remittent fever with typhoid prostration.

Water supply—Public water supply from reservoir, good in all months of the year.

Sewage disposal—Cesspools, top of ground and into Naugatuck river.

Drainage—No general system.

General Sanitary Condition of town—Water supply good. Sewage and drainage bad.

New Haven—Gustavus Eliot, M.D.

Diseases specially prevalent—During the year covered by this report one thousand seven hundred and seven deaths have been reported. This is two hundred and twenty more than were reported during the preceding year. There was an increased mortality during the months of January, February, March, May, July, August and October, 1890. This increase was greatest in January, during which month there were two hundred and twenty-five deaths, while in the same month of the preceding year there were only one hundred and twenty-one. In July, 1890, two hundred and eleven deaths were reported, and in July, 1889, one hundred and fifty-nine. In August the mortality was one hundred and forty-eight, and in the corresponding month of the previous year one hundred and thirteen. In March, 1890, there were one hundred and forty-nine deaths, while in March of the preceding year there were only one hundred and twenty-two. Thus it will be seen that in these four months alone there was an increase in the mortality of two hundred and eighteen—a number which lacks only two of being equal to the total increase of mortality for the year. The increase during the other three months mentioned was, therefore, nearly counterbalanced by a diminution in the mortality of the five months not mentioned.

Looking now at the records of mortality for the months in which there was the greatest increase, it will be found that this increase was chiefly due to an increased mortality, during January, from phthisis, bronchitis, pneumonia and congestion of the lungs; during March, from diphtheria and membranous croup, and pneumonia and congestion of the lungs; and during July and August from diarrhœal diseases, infantile debility, and heart disease. The mortality statistics, therefore, indicate that during the winter months diseases of the respiratory organs were rather more prevalent than usual, and that during the summer months diarrhœal diseases and diseases of the heart prevailed to a somewhat unusual extent. The experience of most active practitioners corroborates, I believe, these deductions. It should also be mentioned that typhoid fever and diphtheria have been somewhat more prevalent than usual.

Are the Causes known and removable?—Only to a limited extent.

Please state additional particulars of interest—Epidemic influenza appeared in New Haven December 21, 1889. A small number of cases, in which the disease originated elsewhere, may have been observed a few days earlier than this. After January 31, 1890, few, if any, new cases occurred. During the six weeks of the epidemic it is probable that between twenty and forty per cent. of the people suffered from the disease, and perhaps as many more thought that they did, but did not. During the last few months of the present year not a little has been heard of persons who have been recently attacked with the influenza. There is good reason for believing that such cases have for the most part been reported by physicians whose medical opinions are fanciful and inaccurate—not scientific and exact.

The epidemic of influenza influenced mortality to a considerable extent, not because the disease caused very many deaths directly, but because, when it attacked patients who were debilitated, or who were suffering from other diseases, it exhausted what little vitality they had, and left them an easy prey to the maladies with which they had been making a not altogether hopeless struggle. Others it left weakened and debilitated so that, when other diseases attacked them, they succumbed to maladies of such a degree of severity as under ordinary circumstances might have been successfully resisted. Others still were left with some constitutional or local weakness—some with a condition of

what might be called general debility, some with a cough or other indication of some local disorder—which persisted for month after month, so that now, ten months after the close of the epidemic, not a few people trace their ill health back to the time of the epidemic, just as not long since many invalids referred the beginning of their ill health to the great blizzard of 1888.

During the epidemic a great deal was heard of cases in which the influenza "ran into pneumonia." While perhaps this pathological sequence may have actually occurred in a few instances, it is nevertheless very probable that the frequency of this occurrence was greatly exaggerated, and that this was said to have happened in a great many instances, because the existence of pneumonia was overlooked during the early days of the disease; and that many patients, in whom this was believed to have occurred, never had the influenza at all, but were in reality suffering from pneumonia at the very time that their physicians, wearied by overwork, after a hasty and imperfect examination, had confidently assured them that they were suffering with the influenza.

Rare or strange diseases—Under this head may very properly be included the epidemic of influenza, which has been already mentioned.

Has Typhoid Fever been unusually prevalent?—Yes. One hundred and twenty-three cases were reported to the board of health, with twenty-four deaths. During the preceding year, seventy-five cases were reported, with thirty-three deaths. These numbers do not correctly indicate the relative prevalence of the disease, nor its relative mortality, during the two years. Unquestionably a great many cases of typhoid fever are never reported. All deaths, on the other hand, are necessarily reported. It is not at all improbable, also, that some deaths are reported as having been caused by typhoid fever, which in reality were due to some other disease. One inference, however, which may be drawn from the numbers mentioned, and which, I believe, the experience of most physicians in the city would confirm, is that, for the most part, the cases which have been observed have been of a somewhat milder type than the cases of the preceding year. The cases reported were distributed very widely through the different sections of the city.

In what months most prevalent?—August, September and October.

Has it been traced in any instance to a special source?—A few cases which occurred on Franklin street were traced directly to a Swedish girl, who suffered an attack of the disease on the voyage from Sweden to this country.

Is disinfection of excreta of Typhoid patients insisted upon by the physicians in your vicinity?—Much more generally than was the case a few years ago.

Extent and prevailing type of Scarlet Fever?—Eighty-six cases were reported, with three deaths. These numbers indicate that the disease was not very prevalent, and that most of the cases were of a mild type.

Are isolation and disinfection usually practiced with Scarlet Fever patients?—Yes, with much greater thoroughness than formerly, but in many cases not as perfectly as is desirable, or as is necessary in order to prevent the dissemination of the disease.

Extent and prevailing type of Measles—There were but few cases of measles, and these were of a mild type. No deaths from measles have been reported during the last two years.

Restrictive precautions—Much less pains is taken to prevent the spread of the disease than is the case with scarlet fever and diphtheria.

Diphtheria. Extent and type—Three hundred and thirty cases were reported, of which one hundred and ten proved fatal. These numbers indicate a mortality of thirty-three and one-third per cent. Such a rate of mortality would not reflect much credit upon the physicians of New Haven, and it is necessary to repeat the explanation, which was made in speaking of typhoid fever, that many cases, especially when the disease is not severe, are never reported, while all deaths are reported. The cases have been of all grades of severity—some malignant, others exceedingly mild.

Proportion of deaths—The actual rate of mortality is probably between ten and twenty per cent.

Are isolation and disinfection practised?—The remarks made upon this subject, while speaking of scarlet fever, apply also to diphtheria.

Can you give any facts relating to its beginning and mode of spreading?—The disease has been widely disseminated throughout the city. The most careful investigation has failed to reveal the origin of many cases. The disease spreads, or does not spread, under such a variety of circumstances that it is impossible

to formulate any rules which will satisfactorily explain why some families and some children suffer from the disease, and why other families and other children, with similar surroundings, or similar exposure, escape it.

General sanitary condition of houses infected with diphtheria—In some instances the disease has oocurred in the midst of good sanitary surroundings, but generally it is easy to discover some defect of plumbing, drainage, or the disposal of refuse. On the other hand it should be mentioned that many children, in whose homes exist the most striking evidences of an absolute disregard of all the teachings of sanitary science, entirely escape the disease.

Have malarial diseases prevailed more than in 1889, or less?—Intermittent and remittent fevers are becoming less common every year. If people would stop calling every slight indisposition from which they suffer, malaria; and if physicians would find some other name to apply to complaints the nature of which they do not understand, we should hear much less of malaria, and New Haven would soon lose the reputation, which she has had so long, and which she does not now deserve, of being a city in which malaria and malarial diseases abound.

If at all, what is their general character?—The most common form is a simple intermittent fever, which generally promptly yields to appropriate treatment.

What is the water supply of your town?—From Lake Whitney, the Maltby Park Lakes, Lake Saltonstall, Wintergreen Lake, and from wells.

Is the water supply good?—Yes.

In all months of the year?—It has been good during all the months of the past year.

Sewage Disposal—By sewers, which empty into the harbor or adjacent rivers, and by cess-pools and vaults.

What of the Drainage?—The drainage is for the most part excellent.

In general, what is the Sanitary Condition of town, as regards Water Supply, Sewage Disposal and Drainage? Good? Bad? or Indifferent?—Good.

North Branford—C. W. Gaylord, M.D.

Diseases specially prevalent—None except influenza in early part of year. Whooping cough quite prevalent among children during spring and early summer.

Typhoid Fever—Not unusually prevalent.

Is Disinfection of excreta of typhoid patients insisted upon by the physicians in your vicinity?—Can answer for myself only. I always insist on thorough disinfection and burial.

Scarlet Fever—None. Isolation and disinfection are usually practiced with scarlet fever patients.

Measles—I think none.

Diphtheria—None to my knowledge.

Malarial diseases—Less, if anything.

Water supply—Wells, cisterns and springs. As a rule, good in all months of the year.

Sewage disposal—Cesspools and surface-drain mainly.

Drainage—Natural and very good.

General Sanitary Condition of town— Fair.

North Haven—R. B. Goodyear, M.D.

Diseases specially prevalent—La Grippe, in early months; malarial and diarrhœal in summer and autumn months, and catarrhal and pulmonary in October and November. The health of the town in the early part of the year was much below the average. La Grippe increased the mortality in all pulmonary diseases; but, considering the number of cases treated, the mortality was comparatively light. The summer months were unusually healthy. Diarrhœal diseases in children were quite severe. Diseases of the respiratory organs are more prevalent again at present writing.

Typhoid Fever—A few isolated cases in September and October. In two instances the sanitary conditions were bad.

Is disinfection of excreta of typhoid patients insisted upon by the physicians in your vicinity?—They are advised, but are frequently beyond the control of the physicians.

Scarlet Fever—Only a few cases—mild type. I am very particular to insist on both isolation and disinfection. Cannot speak for other physicians. They do not report malignant cases to the sanitary officer. And, as far as I have been able to learn, have not been particular to insist on isolation and disinfection. Instruction as to proper methods of disinfection is not given.

Measles—No epidemic. Families in which the disease appears are kept at home as much as possible.

Diphtheria—More prevalent than some former years—mild. Isolation and disinfection are practiced.

Facts relating to its beginning and mode of spreading—Four cases visiting relatives, taken next day after arriving; traced directly to their home in the city. Defective plumbing. Another family of four children; kitchen and dining-room in one, with sink untrapped in same room, and opening into sleeping-room.

Malarial Diseases—Rather more prevalent than in 1889.

General Character—Modified intermittent.

Water Supply—Wells and springs, good in all months of the year.

Sewage Disposal—No sewers.

General Sanitary Condition of town—Good. There are but few houses in the town where the conditions for drainage are not favorable. A few only in which there is inexcusable negligence, in the sanitary surroundings; but in many dwellings more attention to minor details of kitchen refuse, location of cesspools, etc., would improve the conditions.

Orange—John F. Barnett, M.D.

Diseases specially prevalent—Malarial. Malaria in its different forms prevails, mostly in the neighborhood of marshy localities. Could these be properly drained, in my judgment, this form of disease would be greatly diminished.

Rare, or Strange Diseases—Cerebro spinal meningitis. Rare in this town.

Typhoid Fever—Has not been unusually prevalent. Disinfection of excreta of typhoid patients is, I think, insisted upon by the physicians.

Scarlet Fever—Very little—only in sporadic form—during past year. Isolation and disinfection not practiced with scarlet fever patients as strictly as it should be.

Measles—No epidemic during past year. No special restrictive precautions were taken.

Diphtheria—None during past year.

Malarial Diseases—About the same in extent. Chills and fever, "dumb ague" and malarial fever.

Water Supply—Mostly surface water, collected in artificial pond. Not good in all months of the year, worse in summer months.

Sewage Disposal—No sewers—cesspools in general use.

Drainage—Fair.

General Sanitary Condition of town—Indifferent.

Oxford—Louis Barnes, M.D.

Diseases specially prevalent—Measles, in April and May, combined with pneumonia—2 deaths. Measles generally mild. Whooping-cough, general and severe in the earlier months of the year. The summer and autumn has been healthy.

Typhoid Fever—Not a case.

Scarlet Fever—A few mild cases. Isolation and disinfection are usually practiced with scarlet fever patients.

Measles—First case came from Bridgeport, in April; two in that family died from want of care. No restrictive precautions. As a rule people avoid contagion.

Diphtheria—None.

Malarial Diseases—The same as in 1889.

General Character—Asthenic.

Water Supply—Springs and wells. Good in all months of the year.

Sewage Disposal—By open drains; cesspools, and again thrown broadcast to desiccate in the wind and sun.

Drainage—Mostly into rivulets and brooks. Would be called good.

General Sanitary Condition of town—Good.

Prospect—M. N. Chamberlin, M.D.

Diseases specially prevalent—None except influenza last winter.

Typhoid fever—Two or three cases. In November and December, '89. No deaths. Not traced in any instance to a special source.

Is disinfection of excreta of typhoid patients insisted upon by the physicians in your vicinity?—Cannot positively say. Think some insist on it.

Scarlet fever—Not any.

Measles—Very few cases if any. No precautions.

Diphtheria—One case. One death. Isolation and disinfection are practiced. Case imported from Waterbury.

Malarial diseases—Same as in '89. Mild.

Water supply—Mostly from wells. A few springs. Good in all months of the year.

Sewage disposal—Surface.

Drainge—Surface. Good.

General Sanitary Condition of town—Good.

Seymour—R. E. Warner, M.D.

Diseases specially prevalent—During winter and spring La Grippe, whooping cough and pneumonia.

Typhoid Fever—Not unusually prevalent. Disinfection of excreta of typhoid patients is insisted upon by me.

Scarlet Fever—One case. Simplex. Imported.

Are isolation and disinfection usually practiced with scarlet fever patients?—Yes, speaking only for myself.

Measles—None.

Diphtheria—Few cases in my practice, generally of mild form. One death. Isolation and disinfection are practiced.

General sanitary condition of house infected with diphtheria—Bad.

Malarial Diseases—About the same as in '89.

Water Supply—Mostly wells. Good in all months of the year except in the immediate center known as the flats.

Sewage Disposal—Few private sewers into Naugatuck river. Cesspools generally.

Drainage—Good.

General Sanitary Condition of town—Indifferent.

Southbury—M. C. Cooley, M.D.

Diseases specially prevalent—La Grippe, bronchitis and pneumonia.

Typhoid Fever—No typhoid to my knowledge. Disinfection of excreta of typhoid patients is insisted upon by the physicians.

Scarlet Fever—There has been several cases of scarlet fever, all of which were confined to one family by isolation. The disease was brought from Bridgeport. Isolation and disinfection is always practiced in this town.

Measles—No cases during the year.

Diphtheria—No cases that I know of.

Malarial Diseases—About the same as in 1889.

General character—The tertian most common.

Water Supply—Wells and springs. Usually good in all months of the year.

Sewage Disposal—None except vaults and cesspools.

Drainage—Good.

General Sanitary Condition of town—Very good.

Wallingford—W. S. Russell, M.D.

Diseases specially prevalent—Pertussis, malaria, influenza.

Typhoid Fever—A few cases in August and September. Not traced in any instance to a special source. Disinfection of excreta of typhoid patients is insisted upon by the physicians.

Scarlet Fever—Have had a few mild cases. Isolation and disinfection are usually practiced with scarlet fever patients.

Measles—Very rare.

Diphtheria—Very rare. Isolation and disinfection are practiced.

Malarial Diseases—About as usual.

Water Supply—Pistapaug lake. Good in all months of the year.

Sewage Disposal—Quinnipiac river.

General Sanitary Condition of town—Good.

NEW LONDON COUNTY.

Bozrah—Nathan Johnson, M.D.

Diseases specially prevalent—None, except the epidemic influenza, which prevailed generally throughout the country during the early months of the year, beginning about the first of January and continuing to March. Some of the cases were quite severe with a few fatal, especially those running into pneumonia. In some of the cases the respiratory organs were principally affected, in others the nervous system. In one case, that of a boy seventeen, there was complete loss of power of the voluntary muscles and of bladder.

Typhoid Fever—Have not seen a case for a year. Disinfection of excreta of typhoid patients is insisted upon by the physicians.

Scarlet Fever—Have not seen a case. Isolation and disinfection are usually practiced with scarlet fever patients.

Measles—None.

Diphtheria—Have not seen a case during the year. Isolation and disinfection are practiced.

Malarial Diseases—About same.

General Character—Mild.

Water Supply—Mostly wells and springs. Generally good in all months of the year.

Sewage Disposal—Open drains and cesspools.

Drainage—Natural. Little attempts at drainage.

General Sanitary Condition of town—Generally good.

Franklin—Nathan Johnson, M.D.

Diseases specially prevalent—None, except influenza, which prevailed generally in the months of January, February and March; mild in character. In winter and spring there were colds, rheumatism and neuralgia, in summer diarrhœa, not more than usual, and not severe in type.

Typhoid Fever—I think I cannot recall a case. Disinfection of excreta of typhoid patients is insisted upon by the physicians.

Scarlet Fever—Have not seen a case. Isolation and disinfection not usually practiced with scarlet fever patients.

Measles—I have not seen a case.

Diphtheria—Have not seen a case since last report. Isolation and disinfection are practiced.

Malarial Diseases—About the same as in 1889.

General Character—Remittant.

Water Supply—Wells mostly. Good in all months of the year.

Sewage Disposal—Surface and cesspools.

Drainage—Natural.

General Sanitary Condition of town—Good.

Griswold—Geo. H. Jennings, M.D.

Diseases specially prevalent—Diphtheria, typhoid fever.

Are the causes known and removable?—Of typhoid fever—yes.

Rare or Strange Diseases—Hydrophobia.

Typhoid Fever—Has been unusually prevalent during September and October. All but four cases obtained drinking water from same wells (the two wells were near together and in both there was undoubtedly contamination from cesspools and perhaps from privy vaults. Disinfection of excreta of typhoid patients is generally insisted upon by physicians.

Scarlet Fever—But four cases reported during the year. Isolation and disinfection are not usually practiced.

Measles—No cases reported.

Diphtheria—Thirty-seven cases reported, of these 17 cases occurred in November and 10 in October. But one case reported since April.

Proportion of deaths—Six per cent. Isolation and disinfection generally practiced.

Can you give any facts relating to its beginning and mode of spreading?—Seldom of beginning, often the first case is not recognized until the whole or a part of the family are infected.

General Sanitary Condition of houses infected with diphtheria—Not good.

Malarial Diseases—About the same as last year.

General Character—Sometimes with the regular periods of chill, fever and sweating with complete intermission of symptoms. Most generally as complicating some other disease or by a general continued *Malaise.*

Water Supply—Wells and springs. A few wells have been bored. Fair in all months of the year.

Sewage Disposal—Cesspools generally, and also on surface. In one factory village all cesspools have been filled and the sewage flows on the surface. In one other (where the most of our typhoid fever prevailed this fall), a trough drainage system is now being put in that will carry all sink drains and wash water also surface water into the river.

Drainage—Other than the care just spoken of, no particular drains exist.

General Sanitary Condition of town—Water supply fairly good. Sewerage and drainage bad.

Groton—A. M. Purdy, M.D.

There has been no disease during the past year which could be considered as specially prevalent. During the summer months the gastro enteric diseases had about their usual run, but nothing approaching an epidemic. Eight cases of scarlet fever were reported, four of which were mild, while four assumed the angina type, one death. While the local physicians practice isolation and disinfection as far as practicable the prevention of a more serious outbreak can be, I think, in a great measure attributed to the Board of Health, the president of which, L. M. Guernsey,

being an active and efficient officer, and doing everything possible to improve the sanitary condition of the town. No cases of measles. Three cases of typhoid fever; in none of the three could the cause be determined positively. No fatal case. The village derives its water supply from a small lake about two miles distant, and was selected only after an analysis proved it superior to other available sources, the water is excellent at all seasons of the year. We have no system of sewage, and the larger part of the village being nearly if not quite level with the sea, the drainage cannot be said to be good.

Lebanon—W. P. Barber, M.D.

Diseases specially prevalent—Not any.

The year closing December 31st, 1890, has up to this time been an especially healthy year in the history of this town. No epidemical diseases have visited the town during this period. I think no case of scarlet fever, typhoid fever, diphtheria or measles has occurred in this town during the year. The influenza which visited us in a mild form last spring left little or no trace of its occurrence. We have to report a very healthy year; too healthy for doctors to live comfortably.

Rare or Strange Diseases—A case of tumor of the brain, and one of rupture of the heart, both verified by autopsy.

Malarial Diseases—Have prevailed less than in 1889.

General Character—Mild.

Water Supply—Wells. Fairly good in all months of the year. Better in the winter.

Sewage Disposal—Cesspools and open drains.

Drainage—There is no system of drainage.

General Sanitary Condition of town—The sanitary condition of this town as regards water supply, sewage disposal and drainage is about the same as you will find in the rural towns of Connecticut. The ice supply is from a pond which receives the drainage of a cemetery and must necessarily be bad.

Ledyard—A. M. Purdy, M.D.

This town containing no large villages has been exempt from an epidemic, in fact I can learn of no contagious disease during the past year. The sanitary condition of the town is good, not, however, owing to any special effort on the part of its officials, but to natural causes, location, elevation, etc.

Lyme—J. G. Ely, M.D.

Diseases specially prevalent—Typhoid fever, pneumonia and dysentery.

Typhoid Fever—Has been unusually prevalent during October and November ; not traced in any instance to a special source. Disinfection of excreta of typhoid patients is insisted upon by the physicians.

Scarlet Fever—None.

Are isolation and disinfection usually practiced with Scarlet Fever patients—Isolation, no. Disinfection, yes.

Measles—None.

Diphtheria—None.

Malarial Diseases—About the same.

General Character—Intermittent and remittent fevers.

Water Supply—Wells and springs. Good in all months of the year.

Sewage Disposal—Cesspools and vaults.

Drainage—The drainage in this town is excellent.

General Sanitary Condition of town—It is good.

New London—A. W. Nelson, M.D.

Diseases specially prevalent—Old age, continued and malarial fever. January and February, Grip of mild type, but very prevalent—some influenza of like type only recently.

The fatality of Grip was very light, except in a few instances from intercurrent diseases. Nearly half the people in town had the Grip. Rather more cases of acute Bright's disease than usual—perhaps malarial.

Rare or strange Diseases—Rabies of paralytic type in two dogs in October, seen by a competent veterinary surgeon, and killed. One person with flesh wound upon index finger exposed to infection by pushing finger into mouth of dog, ignorantly, two weeks later treated by 42 inoculations at Pasteur Institute, New York. Symptoms from inoculation very slight, hardly noticeable.

Typhoid Fever—Not unusually prevalent; most in autumnal months. Not traced in any instance to a special source. Disinfection of excreta of typhoid patients is insisted upon by the physicians.

Scarlet Fever—Only a few cases—mild. Isolation and disinfection are practiced to a considerable extent with scarlet fever patients.

One case this late autumn not reported. Being mild no physician called, and the contagion was conveyed by clothing sent to wash, and clothing of other party infected, which was sent to same wash-woman. This is one instance. A general ignorance of all concerned is the only mitigation of the offense.

Measles—None reported. Restrictive precautions taken, only in severe cases.

Diphtheria—Very little. Isolation and disinfection are practiced.

Malarial Diseases—Rather less prevalent than in 1889.

General Character—Irregular in type; some cases of semi-remittent fever, especially benefited by quinine. Cases reported as typhoid; probably malarial.

Water Supply—Artificial from lake, six miles from town. Water excellent, except for a few weeks in June and July it has a bad odor. Not unhealthy as far as known. Thought to derive odor from fresh-water sponge.

Sewage Disposal—Thickly settled part of city well sewered, viz: North part, one mile square, has five miles of well-laid sewers, emptying into the Thames river, and work still going on.

Drainage—Plumbing in connection with public sewers of first class. Regulated by city ordinance.

General Sanitary Condition of town—Good.

Additional—Two very large new school houses built last year, with ample land, and with every sanitary precaution. One or possibly two more will soon be built. The old school houses—some already—and others will be sold. The sanitary reform in this matter is very marked. The one or two other new houses are, however, already needed. These old school houses, from the overcrowding and unsanitary arrangements, have been a constant cause of sore throats of all types.

North Stonington—E. K. Knowles, M.D.

Diseases specially prevalent—None.

Typhoid Fever—Not unusually prevalent. Some in October. There have been but very few cases in town, and those of a mild type. No deaths. Disinfection of excreta of typhoid patients is insisted upon by me.

Scarlet Fever—There has been but few cases of Scarlatina simplex. Isolation and disinfection are usually practiced with scarlet fever patients.

Measles—There have been few cases in the eastern part of the town.

Restrictive precautions—None.

Diphtheria—Less than in years. No deaths. Isolation and disinfection are practiced.

Malarial Diseases—Have prevailed less than in 1889.

Water Supply—Springs and wells. Good in all months of the year.

Sewage Disposal—Surface.

Drainage—Good.

General Sanitary Condition of town—I think it might be classed as good.

Norwich—Lewis L. Paddock, M.D.

Diseases specially prevalent—Nothing has been prevalent during the past year.

Please state additional particulars of interest—During January the "Grippe" very generally. It was generally characterized by pain, fever, followed by prostration. I saw no fatal cases. I had one case, an adult, who was very delirious for three days. Another, a child, complicated with pleurisy. Both were seriously ill.

Typhoid Fever—I have seen but one case this season, and that was during the past three weeks. Has not been traced to a special source. Disinfection of excreta of typhoid patients is, I think, insisted upon by the physicians.

Scarlet Fever—Few mild cases.

Are isolation and disinfection usually practiced with scarlet fever patients?—The physicians insist upon it, but there are many ignorant and obstinate people who are careless about isolation and disinfection.

Measles—Have seen none.

Diphtheria—About a month or six weeks ago it broke out in a dangerous form in Taftville, a neighboring village.

Proportion of Deaths—Perhaps one-third. Isolation and disinfection are now practiced.

Can you give any facts relating to its beginning and mode of spreading? It was among Canadian French families generally, and at first, visiting the sick was unrestricted.

General Sanitary Condition of houses infected with Diphtheria—The house drainage was by sinks, communicating with cesspools near by. Have been thoroughly disinfected, and the disease has disappeared.

Malarial Diseases—About the same ; mild.

Water Supply—City reservoir ; many springs and ponded water. Good in all months of the year. At this time it is slightly yellow, and has a sweetish taste occasionally.

Sewage Disposal—By sewers emptying into the river.

Drainage—Our hills make drainage very natural and easy. The waste water finds its way to the rivers by sewers or otherwise.

General Sanitary Condition of town—Good.

Old Lyme—G. W. Harris, M.D.

Diseases specially prevalent—None.

Typhoid Fever—But two cases in September. Infected out of town.

Is disinfection of excreta of typhoid patients insisted upon by the physicians?—Burying, burning, and boiling water are thoroughly used.

Scarlet Fever—None.

Measles—None.

Diphtheria—Isolated, and mild cases. No deaths. Isolation and disinfection practiced as practicable.

Malarial Diseases—Have prevailed less than in 1889.

Water Supply—Wells. Good in all months of the year, if wells are in good order.

Sewage Disposal—Cesspools.

Drainage—Good, natural drainage.

General Sanitary Condition of town—Good.

Salem—Charles F. Congdon, M.D.

Diseases specially prevalent—La Grippe, hives, diarrhœa, dysentery.

Typhoid Fever—Has not been unusually prevalent. Disinfection of excreta of typhoid patients is not insisted upon by the physicians.

Scarlet Fever—Two mild cases.

Are isolation and disinfection usually practiced with scarlet fever patients—Do not have any to practice on.

Measles—One family. Mild type.

Restrictive precautions—Isolation.

Diphtheria—Only a very few mild cases of sore throat. No deaths.

Malarial Diseases—Nothing to speak of.

Water Supply—Wells. Good in all months of the year.

Sewage Disposal—Sink drains and privies.

Drainage—Fair. Some cellars are over-flowed in the winter and spring.

General Sanitary Condition of town—Generally good.

Sprague—T. I. Stanton, M.D.

Diseases specially prevalent—None.

Typhoid Fever—Not a case in town to my knowledge. Disinfection of excreta of typhoid patients is insisted upon by the physician.

Scarlet Fever—No cases. Isolation and disinfection are usually practiced with scarlet fever patients.

Measles—No cases. No precautions ; the dread of the disease is protection enough.

Diphtheria—A few cases only.

Proportion of deaths—One-half. Isolation and disinfection are practiced. It did not spread.

General Sanitary Condition of houses infected with diphtheria—Good.

Malarial Diseases—Have not prevailed more than in 1889.

General Character—Mild.

Water Supply—From wells. Excellent in all months of the year.

Sewage Disposal—We have no system of sewage.

Drainage—Very good.

General Sanitary Condition of town—Good.

Stonington—F. A. Coates, M.D.

Diseases specially prevalent—La Grippe and its sequelæ.

Causes—Atmospheric. From the time the above disease made its appearance until now, we have had more sickness of apparently

malarial origin than ever known before. No regular intermittent and few cases of fever, but patients, many able to be about, suffering from an undefined feeling of malaise, with torpid liver, obstinate constipation, sometimes slight chills, tendency to break out in profuse perspiration at times, (this will sometimes be at a regular hour each day, or more often from 3 to 6 A. M.). These cases are very obstinate. Another feature of this trouble in many cases is an increased heart action, amounting often to distressing palpitation, worse after a full meal or exercise. Notably worse upon lying down at night.

Typhoid Fever—Only now and then a case, and that of a typho-malarial type rather than genuine typhoid.

Is disinfection of excreta of typhoid patients insisted upon by the physicians in your vicinity?—Not as much as it should be.

Scarlet Fever—Few cases, mostly of a mild character. Isolation is generally practiced.

Measles—Very few cases. Few restrictive precautions are practiced, as parents unless the prevailing type is severe, generally prefer their children should have this disease, rather than take the chances of getting it in adult life.

Diphtheria—Now and then a case. Death rate very small. Isolation and disinfection are practiced.

Malarial Diseases have prevailed more than in 1889.

General Character—Cases stubborn but rarely fatal.

Water Supply—An unusually good system of water works, wells and cisterns. Good in all months of the year.

Sewage Disposal—Cesspools of all sorts and varieties, good and bad.

Drainage—The natural drainage of the earth.

General Sanitary Condition of town—Fairly good.

Voluntown—W. R. Davis, M.D.

Diseases specially prevalent—Some low types of fevers, and many cases of bronchial troubles. We also have a disease that is similar to La Grippe, but not so hard a type.

Rare or Strange Diseases—We have a humor, similar to the Itch. Runs a definite course and hard to manage.

Typhoid Fever—But a few cases. Most prevalent in October and November. Not traced in any instance to a special source. Disinfection of excreta of typhoid patients is insisted upon by the physicians.

Scarlet Fever—Have not had a case. Neither have I heard of any. Isolation and disinfection are practiced to some extent with scarlet fever patients.

Measles—No cases.

Diphtheria—We have had but a few cases (ten cases, one death of the ten). Isolation and disinfection are practiced.

Facts relating to its beginning and mode of spreading—Bad sink drains, and the many ponds that surround the town.

General Sanitary Condition of houses infected with Diphtheria—Generally quite good. Some of the poorer classes, it is very bad.

Malarial Diseases—About the same as in 1889.

General Character—Quotidian. Some few cases take the typhoid type, but no deaths.

Water Supply—Wells. Spring and fall not so good.

Sewage Disposal—There is no general way.

Drainage—Not very good.

General Sanitary Condition of town—Bad.

FAIRFIELD COUNTY.

Bethel—A. E. Barber, M.D.

Diseases specially prevalent—Influenza or La Grippe in January and February. Since this, none in particular. We have had quite a good many cases of mild fever, mostly of a remittent type, associated with bilious symptoms. Rheumatism and neuralgia more general than usual. A few cases of dysentery.

Typhoid Fever—Has not been unusually prevalent. Disinfection of excreta of typhoid patients is insisted upon by the physicians.

Scarlet Fever—A few sporadic cases. Isolation and disinfection are usually practiced with scarlet fever patients.

Measles—Very little.

Diphtheria—Not epidemic. A few sporadic cases. Proportion of deaths small. Isolation and disinfection are practiced. Can give no facts relating to its beginning and mode of spreading.

General Sanitary Condition of houses infected with diphtheria—Fair.

Malarial diseases have prevailed less than in 1889.

General Character—Mild.

Water Supply—From reservoir, two miles distant. Good in all months of the year.

Sewage Disposal—Some into cesspools. Many into a running brook.

General Sanitary Condition of town—Good.

Bridgeport—N. E. Wordin, M.D.

Diseases specially prevalent—Consumption, pneumonia, diphtheria. For the ten months of which I have record, June and October not being at hand, the deaths from pneumonia, 104, outnumber those from consumption, 94. This is the first time I have known in which consumption failed to stand first on the mortality list. It is, without doubt, a result of the epidemic of the winter and spring of 1890. During those months the mortality was as follows:

	Pneumonia.	Phthisis.
January,	33	13
February,	6	9
March,	12	6
April,	20	9
May,	10	11

Rare or Strange Diseases—The epidemic of influenza with its complications.

Typhoid Fever—In December and January, a few cases. Disinfection of excreta of typhoid patients is, I believe, insisted upon by the physicians.

Scarlet Fever—Mostly mild in form, and quite evenly distributed. A few malignant cases with twelve deaths. Isolation and disinfection are usually practiced with scarlet fever patients.

Measles—The common form, morbilli vulgaris. Parents do not pay much attention to this disease nor to any restrictions of it.

Diphtheria—It has prevailed during every month of the year, but more especially December and January. Some malignant. One hundred and forty-six cases were reported. Proportion of deaths, thirty-three per cent. Isolation and disinfection are practiced.

General Sanitary Condition of houses infected with Diphtheria—For the most part not good. I believe that most of the cases have been among the poor and dirty.

Malarial Diseases—There has been less, I am sure, of what was so common as typho-malarial fever in 1889. I do not think the malarial fevers are so prevalent. Malarial diseases are mixed in character, so that they cannot be easily classified.

Water Supply—Ponded water from small streams. It is fair in all months of the year. It is now undergoing examination by the State chemist; result not yet determined.

Sewage Disposal—Sewers empty upon the mud flats of the harbor and adjacent creeks, and at times cause very offensive odors.

Drainage—Good.

General Sanitary Condition of town—Water supply, fair; sewage disposal, bad; drainage, good.

Brookfield—A. L. Williams, M.D.

Diseases specially prevalent—"La Grippe".—No deaths.

Typhoid Fever—Not a case. Disinfection of excreta of typhoid patients would be insisted upon if disease prevailed.

Scarlet Fever—No cases the past year. Isolation and disinfection are invariably practiced with scarlet fever patients.

Measles—No cases.

Diptheria—3 or 4 cases—1 fatal. Isolation and disinfection are practiced. The cases above-mentioned contracted from Bridgeport parties.

General Sanitary Condition of houses infected with diphtheria—Good.

Malarial Diseases have prevailed less than in 1889. General character, very mild.

Water Supply—Wells mostly, some from springs through lead pipe, good in all months of the year.

Sewage Disposal—As usual in towns of sparse population. No sewerage.

General Sanitary Condition of town—Good.

Danbury—E. A. Stratton, M.D.

Diseases specially prevalent—During August and September a widely-distributed epidemic of Urticaria.

Rare or Strange Diseases—One case of pemphigus.

Typhoid Fever—Most prevalent in August and September.

Has it been traced in any instance to a special source? In spite of public improvements on streets there has been much less than

in former years. Disinfection of excreta of typhoid patients is insisted upon by the physicians.

Scarlet Fever—Isolated cases of a mild type. Isolation and disinfection not thoroughly practiced with scarlet fever patients.

Measles—Very few cases. No restrictive precautions.

Diphtheria—Some scattered cases, but few severe. Proportion of deaths, small. Isolation and disinfection are practiced.

General Sanitary Condition of houses infected with diphtheria—In most cases very bad; questionable in all.

Malarial Diseases—Have prevailed more than in 1889.

General Character—Typho-malaria; some intermittent fever.

Water Supply—Kohanza and Padanaram reservoirs. Good in all months of the year.

Sewage Disposal—No improvement. Sewers are being built to empty into Still river, in the center of the city, and the sewerage is carried through a thickly-settled portion, causing a large portion of our malaria and diphtheria.

Drainage—Fair.

General Sanitary Condition of town—Good water supply, fair drainage, and bad sewerage.

Darien—Samuel Sands, M.D.

Diseases specially prevalent—None.

Rare or Strange Diseases—"La Grippe." About twenty-five per cent. of the inhabitants suffered from "La Grippe."

Typhoid Fever—A few cases in June and July. No deaths. Traced to a filthy cellar. Disinfection of excreta of typhoid patients is insisted upon by the physicians.

Scarlet Fever—A few cases, mild. No deaths. Isolation and disinfection are usually practiced with scarlet fever patients.

Measles—None.

Diphtheria—Twenty cases. Two deaths. Isolation and disinfection are practiced. A few cases were imported and a few sporadic.

General Sanitary Condition of houses infected with diphtheria—Fair, with but one exception.

Malarial Diseases—Have prevailed less than in 1889. Mild in character.

Water Supply—Wells. Good in all months of the year.

Sewage disposal—Mostly cesspools.

Drainage—No general system of drainage.

General Sanitary Condition of town—Good as in most country towns.

Easton—Seth Hill, M.D.

Diseases specially prevalent—None except the Grip.

Typhoid Fever—Not any.

Scarlet Fever—Isolation and disinfection are practiced as far as possible with scarlet fever patients.

Measles—Not any.

Diphtheria—Not any.

Malarial Diseases—Have prevailed less than in 1889. General character, rheumatic.

Water Supply—The usual supply of country towns.

General Sanitary Condition of town—Good, bad and indifferent.

Fairfield—W. H. Donaldson, M.D.

Diseases specially prevalent—La Grippe and pertussis in January and February.

Typhoid Fever—Only one or two cases in October. Contracted, in one case, at a summer resort in New Jersey. Disinfection of excreta of typhoid patients is always insisted upon by the physicians.

Scarlet Fever—None. Isolation and disinfection are always practiced with scarlet fever patients.

Measles—Very few cases and mild.

Diphtheria—A few cases only. One death. Isolation and disinfection are practiced. Most cases clearly arose from bad sanitary conditions.

General Sanitary Condition of houses infected with diphtheria—Bad.

Malarial Diseases—More, decidedly.

General character—Many cases intermittent and remittent fevers; also the usual malarial complications of other diseases.

Water Supply—Wells. Very good in all months of the year.

Sewage Disposal—Cesspools mostly. Some private sewers.

Drainage—Good in most parts of the town. A good, natural subsoil drainage.

General Sanitary Condition of town—Good.

GREENWICH—SPENCER FRANKLIN, M.D.

Diseases specially prevalent—Influenza, or La Grippe, and malarial fevers. Those of malarial origin are due, to a large extent, to the unhealthy condition of the houses of the poorer classes, which are mostly built with little or no cellars, and those undrained. In summer the sleeping-rooms get but scant ventilation; in winter, many of them, none at all. During the epidemic of influenza last spring I observed that those attacked with the most severity had previously suffered from malarial poisoning, and with them complications were more frequent.

Rare or Strange Diseases—Influenza.

Typhoid Fever—No cases reported for the year ending November 1st, 1890. Disinfection of excreta of typhoid patients is insisted upon by the physicians.

Scarlet Fever—Nine cases reported during the past year, prevailing type being scarlatina simplex. Isolation and disinfection are usually practiced with scarlet fever patients.

Measles—Ten cases reported for past year. Isolation and disinfection practiced.

Diphtheria—Diphtheritis prevailed to some extent. Mortality $\frac{50}{100}$. Isolation and disinfection are practiced.

Facts relating to its beginning and mode of spreading—The first case reported came from New York City.

General Sanitary Condition of houses infected with diphtheria—Bad. It prevailed largely among the negroes.

Malarial Diseases—More among the poorer classes. Nearly all diseases show more or less marked malarial symptoms. Cases of malarial diseases, uncomplicating other diseases, have mostly been of the quotidian type.

Water Supply—Putnam Lake. The force is good, being sufficient to drive several motors the year round. Very good in all months of the year.

Sewage Disposal—Pipes empty into the Long Island Sound, and are kept well slushed out by the water from the motors.

Drainage—At present only fair, but the natural advantages of its high location are being taken advantage of now, and I think in a short time it will be all that can be expected.

General Sanitary Condition of town—Good. Few towns can claim as many natural advantages—certainly none more. Its high location, fine water supply, and freedom from swampy

ground, make it naturally healthy. Taken in connection with this the sanitary improvements that are being continually made, as the want of them is felt, I feel that we can be justly proud of our town.

Huntington—G. A. Shelton, M.D.

Diseases specially prevalent—Acute and chronic pulmonary diseases, pertussis and zymotic diseases in general. Usually the causes of zymotic cases are known and removable. The health officer requires weekly reports from each teacher in the several school districts in town as to the number of pupils or people who are ill within the area of the district. This furnishes the Health Board each week with a very fair estimate of the sickness within our town borders.

Rare or Strange Diseases—The epidemic influenza and its complications.

Typhoid Fever—Very few cases, mostly in September. Has not been traced in any instance to a special source.

Is disinfection of excreta of Typhoid patients insisted upon by the physicians in your vicinity?—As a rule I believe the excreta are always disinfected.

Scarlet Fever—There has been little or no scarlatina within our lines.

Are isolation and disinfection usually practiced with Scarlet Fever patients?—It is always recommended and I think usually practiced. Our teachers dismiss all pupils living in infected families or immediately exposed to the contagion, and families are instructed by their physician to retain at home all members so exposed.

Measles—None.

Diphtheria—Limited to three or four families. Five fatal cases. Isolation and disinfection are practiced.

Facts relating to its beginning and mode of spreading—Bad drainage, closed cesspools, etc.

General Sanitary Condition of houses infected with Diphtheria—Drainage into cellars from cesspools and closets, and absence of traps in some cases.

Malarial Diseases—Less than in '89.

General Character—Mild and not marked.

Water Supply—Wells through the country portion, city water in Shelton from well arranged reservoirs. Good in all months of the year.

Sewage Disposal—In Shelton we have a good system of public sewers through the more densely populated portion of the village, yet many cesspools are in use still and of necessity in many parts of the borough. In the town outside village surface drainage prevails.

Drainage—Generally good.

General Sanitary Condition of town—Good.

Monroe—J. G. Stevens, M.D.

Diseases specially prevalent—None.

Rare or strange diseases—La Grippe. Quite a number of cases during the past winter and spring months.

Typhoid Fever—Know of none. Disinfection of excreta of typhoid patients is insisted upon by the physicians.

Scarlet Fever—None to my knowledge in the town. Isolation and disinfection usually are practiced with scarlet fever patients.

Measles—None.

Diphtheria—None. Isolation and disinfection are practiced.

Malarial Diseases—No change is marked of a mild type.

Water Supply—Wells and springs. Good in all months of the year.

Sewage Disposal—Vaults, cesspools, drains and surface.

Drainage—Good.

General Sanitary Condition of town—Good.

New Canaan—W. G. Brownson, M.D.

Diseases specially prevalent—None specially prevalent. A generally healthy year in New Canaan.

Typhoid Fever—Very little during the year. Some in September. Disinfection of excreta of typhoid patients is insisted upon by the physicians.

Scarlet Fever—No scarlet fever, I believe. Isolation and disinfection are usually practiced with scarlet fever patients.

Measles—A few mild cases.

Diphtheria—A few mild cases. No deaths. Isolation and disinfection are practiced.

General Sanitary Condition of houses infected with diphtheria—As good as the average in town.

Malarial Diseases—Have prevailed less than in 1889.

General Character—Of a neuralgic character in debilitated subjects, and appearing as a complication in acute affections.

Water Supply—Wells and springs. Generally good in all months of the year.

Sewage Disposal—No general sewage system.

Drainage—Generally good, although improvements in some locations are much needed.

General Sanitary Condition of town—I should say for the town fair. A better system is much needed for the village.

NORWALK—J. G. GREGORY, M.D.

Diseases specially prevalent—None.

Rare or strange diseases—La Grippe.

Typhoid Fever—Yes.

In what months most prevalent?—During the fall and early winter months was unusually prevalent. In one instance it was traced to a well used in common by four families. Twelve cases originated there. Some of them severe, with two deaths. Disinfection of excreta of typhoid patients is as a rule insisted upon by the physicians.

Scarlet Fever—Sporadic cases during the year. Usually mild. During September and October, '90, there were twenty cases reported. The majority of these occurred about the same time and were scattered through the town. It was discovered that a majority of these happened in families who were supplied by the same milkman and along his route. It was also found that there had been a mild case of scarlet fever prior to this in the milkman's own house. Isolation and disinfection are usually practiced with scarlet fever patients.

Measles—A few cases in November, '89, and May, '90.

Restrictive precautions—Isolation.

Diphtheria—Reported in February, May, July, August, September and October. Severe.

Proportion of deaths—Five deaths. About 20 per cent. of cases reported. Isolation and disinfection are practiced.

General Sanitary Condition of houses infected with Diphtheria—Generally poor.

Malarial Diseases—Have prevailed more than in 1889.

General Character—Intermittents, neuralgias and fevers.

Water Supply—Public works. Good in all months of the year.

Sewage Disposal—Carried by sewers into Long Island Sound.

Drainage—Good.

General Sanitary Condition of town—Good.

Redding—R. W. Lowe, M.D.

Diseases specially prevalent—Malaria. The hygenic condition of the town is much better than in previous years.

Typhoid Fever—Have only heard of a few isolated cases. Not traced in any instance to a special source to my knowledge.

Is disinfection of excreta of typhoid patients insisted upon by the physicians in your vicinity?—It is my custom, and I think it is of the others.

Scarlet Fever—Has not been very prevalent. Isolation and disinfection are not usually practiced with scarlet fever patients.

Diphtheria—Have not had a case of true diphtheria this year.

Malarial Diseases—Have prevailed less than in 1889.

General Character—Form of intermittent and remittent fevers.

Water Supply—Spring. Good in all months of the year.

Sewage Disposal—We have no sewerage system. A rapid stream flows through the town which adds to the health of the place.

Drainage—We have no system of drainage except what nature has provided. Part of the town is situated on a ridge and the other in the valley near a running stream. In a general way the sanitary condition of the town is fair.

Ridgefield—W. S. Todd, M.D.

Diseases specially prevalent—La Grippe, whooping cough, gastro-duodenitis. The influenza was quite general, in a few cases severe, but with no complications. Some cases were slow in recovering. Most of those were light originally. Whooping cough of a severe type prevailed in the 5th district in the spring, and in the 4th this fall. Late in August and during September and October we had a large (relatively) number of cases of mild gastro duodenitis with jaundice. No particular reason can be given, as they occurred in best and poorest families.

Typhoid Fever—Not unusually prevalent. Disinfection of excreta of typhoid patients is insisted upon by the physicians.

Scarlet Fever—None. Isolation and disinfection are usually practiced with scarlet fever patients as far as practicable.

Measles—None.

Diphtheria—None.

Malarial Diseases—None.

Water Supply—Mostly wells. In a few cases from springs. Good in all months of the year.

Sewage Disposal—By cesspools with frequent cleaning, and compost heaps.

Drainage—No special system. The Waring is used in a few cases. Abandoned in one.

General Sanitary Condition of town—Good in the sense of considerable care used with the imperfect means at command.

Sherman—John N. Woodruff, M.D.

Diseases specially prevalent—Not any.

Typhoid Fever—Has been unusually prevalent during October and November. Has not been traced in any instance to a special source. Disinfection of excreta of typhoid patients is insisted upon by the physicians, but rarely carried out or thoroughly performed.

Measles—Not a case of measles in town during the year.

Diphtheria—One case, which recovered. Isolation and disinfection are practiced.

General Sanitary Condition of house infected with diphtheria—In the cellar of the house in which this case occurred there was a bin of rotting potatoes.

Malarial Diseases—Have prevailed less than in 1889.

Water Supply—Springs and wells. Good in all months of the year.

Sewage Disposal—Cesspools.

Drainage—Surface.

General Sanitary Condition of town—Good.

Stamford—F. J. Rogers, M.D.

Diseases specially prevalant—The usual diseases peculiar to this town.

Typhoid Fever—Not so much as last year; most prevalent in September, traced to drinking well water supposed to be in-

fected. Disinfection of excreta of typhoid patients is insisted upon by the physicians, generally; some few exceptions.

Scarlet Fever—Some few cases. Generally of a mild form. Isolation and disinfection are usually practiced with scarlet fever patients.

Measles—Not prevailing to any extent.

Diphtheria—An occasional case. Some few fatal cases, probably 1 to 8 or 10. Isolation and disinfection are practiced.

General Sanitary Condition of houses infected with diphtheria—Poor.

Malarial Diseases—About the same.

General Character—Generally mild quotidian.

Water Supply—Trinity Lake. Poor in mid-summer.

Sewage Disposal—Long Island Sound, by sewers.

Drainage—Partial and unsatisfactory.

General Sanitary Condition of town—Good.

Stratford—Wm. B. Cogswell, M.D.

Diseases specially prevalent—La Grippe, bronchitis, rheumatism, intermittent and remittent fevers.

Typhoid Fever—No cases during the year. Disinfection of excreta of typhoid patients is insisted upon by the physicians.

Scarlet Fever—No cases during the year. Isolation and disinfection are usually practiced with scarlet fever patients.

Measles—No cases during the year.

Diphtheria—No cases during the year.

Malarial Diseases—Have prevailed more than in 1889.

General Character—Acute malarial, remittent and intermittent fever.

Water Supply—Wells. Good in all months of the year.

Sewage Disposal—Optional with each householder.

Drainage—No artificial drainage.

General Sanitary Condition of town—Good.

Trumbull—Seth Hill, M.D.

Diseases specially prevalent—None, unless it was the Grip.

Typhoid Fever—Not a case.

Scarlet Fever—Simplex. Isolation and disinfection are practiced with scarlet fever patients as far as possible.

Measles—Not any.

Diphtheria—None. Isolation and disinfection are practiced.

Malarial Diseases—Less than in 1889.

General Character—More of a rheumatic character than any other form.

Water Supply—The usual supply of country towns.

General Sanitary Condition of town—Good, bad and indifferent.

Weston—Frank Gorham, M.D.

Diseases specially prevalent—Influenza.

Typhoid Fever—Most prevalent in September and October. Disinfection of excreta of typhoid patients is insisted upon by the physicians.

Scarlet Fever—Six cases in one family. Severe type; no deaths. Isolation and disinfection are usually practiced with scarlet fever patients.

Measles—No cases.

Diphtheria—Few cases; rather severe. No deaths. Isolation and disinfection are practiced.

Sanitary Condition of houses infected with diphtheria—Good.

Malarial Diseases—About the same.

General Character—Remittent, neuralgia, digestive disturbances.

Water Supply—Wells and cisterns. Good in all months of the year.

Drainage—Good.

General Sanitary Condition of town—Indifferent.

Westport—L. T. Day, M.D.

Diseases specially prevalent—La Grippe, pneumonia and malaria.

Typhoid Fever—I believe there has been no typhoid this year.

Scarlet Fever—None.

Measles—None.

Diphtheria—Only a few mild cases. Isolation and disinfection are practiced.

General Sanitary Condition of the houses infected with diphtheria—Poor.

Malarial Diseases—Less. Mostly of a hybrid character.

Water Supply—By wells and cisterns. Fair in all months of the year.

Sewage Disposal—Mostly cesspools. A considerable number of sewers constructed during the year.

Drainage—Mostly surface.

General Sanitary Condition of town—Good.

Wilton—A. B. Gorham, M.D.

Diseases specially prevalent—None only those peculiar to the season.

Rare or strange diseases—La Grippe during the winter and spring.

Typhoid Fever—About the same amount of typhoid in August, September and October. Has not been traced to special causes. Disinfection of excreta of typhoid patients is insisted upon by the physicians.

Scarlet Fever—None. Isolation and disinfection are usually practiced with scarlet fever patients.

Measles—Do not remember a case of measles.

Diphtheria—No diphtheria. Isolation and disinfection are practiced.

Malarial Diseases—About the same as in 1889.

General Character—Mixed.

Water Supply—Wells. Good in all months of the year.

Sewage Disposal—Privies generally.

Drainage—Very good.

General Sanitary Condition of town—Good.

WINDHAM COUNTY.

Ashford—J. H. Simmons, M.D.

Diseases specially prevalent—Bilious diseases.

Typhoid Fever—No cases. Disinfection of excreta of typhoid patients is insisted upon by the physicians when cases occur.

Scarlet Fever—Not any.

Measles—None.

Diphtheria—No cases.

Malarial Diseases—About the same. Mild character.

Water Supply—Wells. Good in all months of the year.

Sewage Disposal—No sewage except from sink drains.

Drainage—Wholly at a distance from wells.

General Sanitary Condition of town—Good. Very healthy town.

Brooklyn—J. M. Coburn, M.D.

Diseases specially prevalent—Pneumonia, typhoid fever, rheumatism and diphtheria.

Causes known and removable—In regard to typhoid and diphtheria.

Typhoid Fever—Not unusually prevalent. Most in September and October. Traced to the impure drinking water. Disinfection of excreta of typhoid patients, I think, is insisted upon by the physicians.

Scarlet Fever—Not any. Isolation and disinfection are usually practiced with scarlet fever patients.

Measles—Not any.

Diphtheria—About a dozen cases, mild. One death. Isolation and disinfection are practiced.

Facts relating to its beginning and mode of spreading—First case contracted from germs in clothing received from an infected house in distant city.

General Sanitary Condition of houses infected with diphtheria—Good.

Malarial Diseases—Not at all.

Water Supply—Wells. Good in all months of the year except after long and severe rains. Some wells are polluted with the surface drainage.

Sewage Disposal—A few cesspools. No general system.

Drainage—Good for surface drainage.

General Sanitary Condition of town—Good.

Canterbury—E. D. Kimball, M.D.

Diseases specially prevalent—Pneumonia and bronchitis, "La Grippe" acting as exciting cause in many cases.

Typhoid Fever—Not unusually prevalent. Some in October. Not traced in any instance to a special source. Disinfection of excreta of typhoid patients is insisted upon by the physicians.

Scarlet Fever—None. Isolation and disinfection are usually practiced with scarlet fever patients.

Measles—None as far as I know.

Diphtheria—A few cases, simple. No deaths. Isolation and disinfection are practiced.

General Sanitary Condition of houses infected with diphtheria—Some good, others not the best.

Malarial Diseases—I think less.

Water Supply—Principally by private wells. Generally good in all months of the year.

Sewage Disposal—Mostly by private drains.

Drainage—Fairly good.

General Sanitary Condition of town—Taken as a whole I think fully up to the average. (Not being a resident of Canterbury, and only going there as called from Scotland, I am unable to give as full a report as I otherwise could.)

Chaplin—Orin Witter, M.D.

Diseases specially prevalent—Bronchitis and diarrhœa.

Typhoid Fever—There has been but one case in town, in October, traced to impure well water. Disinfection of excreta of typhoid patients is insisted upon by the physicians.

Scarlet Fever—Not a case. Isolation and disinfection are usually practiced with scarlet fever patients.

Measles—Not a case.

Diphtheria—Not a case. Isolation and disinfection are practiced.

Malarial Diseases—Have had but one case and that was imported.

Water Supply—Wells. Good in all months of the year.

Sewage Disposal—None.

General Sanitary Condition of town—Good.

Eastford—E. Keyes Robbins, M.D.

Diseases specially prevalent—None specially prevalent.

Typhoid Fever—Nearly the same as last year. Most prevalent in September and October. Traced to bad drainage.

Is disinfection of excreta of Typhoid patients insisted upon by the physicians in your vicinity?—Yes, in every particular.

Scarlet Fever—None.

Measles—None.

Diphtheria—Two or three cases. One death. Isolation and disinfection are thoroughly practiced. Did not spread.

General Sanitary Condition of houses infected with diphtheria—Poor drainage.

Malarial diseases—Less prevalent than last year.

General Character—Mild.

Water supply—Good, none better. First-rate in all months of the year.

Sewage Disposal—Good.

Drainage—Good.

The sanitary condition of this town is good.

Hampton—H. H. Converse, M.D.

Diseases specially prevalent—La Grippe. I have had quite an experience in the above named disease; in three cases it has caused blindness in one eye, in some cases it has caused deafness, in three cases that have died very suddenly from heart failure and influenza. There has been no treatment in my practice so good as the use of belladonna and aconite and antifebrin.

Typhoid Fever—Only one case; not traced to a special source. Disinfection of excreta of typhoid patients is insisted upon by physicians.

Are isolation and disinfection usually practiced with Scarlet Fever patients?—In all cases.

Measles—Twelve cases in January and February. Restrictive precautions taken.

Diphtheria—A few severe cases of sore throat. Isolation and disinfection are practiced.

Malarial Diseases—Less.

General Character—Only one case with chills and fever. The patient had been a resident of Rhode Island.

Water Supply—Good. Not quite as good in the months of April and May.

Sewage Disposal—Not what it should be.

Drainage—Not very good.

General Sanitary Condition of town—Indifferent.

Killingly and Plainfield—W. H. Judson, M.D.

Diseases specially prevalent—Usual amount of typhoid and an excess of mild influenza.

Typhoid Fever—Not unusually prevalent. Has not been traced to a special source. Disinfection of excreta of typhoid patients is insisted upon by the physicians.

Scarlet Fever—Light. Not much isolated.

Measles—None, or mild. While prevailing, closed schools for two weeks.

Diphtheria—Light.

Proportion of deaths—Don't know, very few. Isolation and disinfection not practiced. Can give no facts relating to its beginning and mode of spreading.

General Sanitary Condition of houses infected with diphtheria—Bad.

Malarial Diseases—Have prevailed more than in 1889.

General Character—Light.

Water Supply—Aqueduct. Good in all months of the year.

Sewage Disposal—Surface.

Drainage—Fair.

General Sanitary Condition of town—Indifferent.

Plainfield—Charles N. Allen, M.D.

Diseases specially prevalent—Influenza, pertussis, dysentery.

Typhoid Fever—Has not been unusually prevalent. Disinfection of excreta of typhoid patients is I believe insisted upon by the physicians.

Scarlet Fever—None. Isolation and disinfection are usually practiced with scarlet fever patients.

Measles—None.

Diphtheria—None. Isolation and disinfection are practiced.

Malarial Diseases—Very little.

Water Supply—Wells and springs.

Is the Water Supply good?—Yes.

In all months of the year?—Yes.

Sewage Disposal—No system.

Drainage—No system.

General Sanitary Condition of the town—Indifferent.

Pomfret—F. G. Sawtelle, M.D.

Diseases specially prevalent—A few cases of measles. One case, although not having any connection with the sanitary condition of the town, was of peculiar interest on account of its rarity. A young woman taking carelessly 115 grains of the hypnotic sulfonal at one dose. When found was in profound coma, cold extremities, very feeble pulse. A marked symptom in convalescence was amnesia.

Typhoid Fever—None.

Scarlet Fever—None.

Measles—A very few mild cases.

Diphtheria—None.

Malarial Diseases—Have not prevailed more than in 1889.

Water Supply—Springs and wells. Water distributed on "The Street" by wind-mills and gravity. Good in all months of the year.

Sewage Disposal—On "The Street" Waring system and well-protected cesspools.

General Sanitary Condition of town—Good.

Putnam—Omer LaRue, M.D.

Diseases specially prevalent –Dyspepsia and bronchitis.

Are the Causes known and removable?—No.

Please state additional particulars of interest—Typhoid fever, of which we had had cases in September and October, 1889, was succeeded in November by numerous cases of simple fever ; neuralgia under the form of headache was pretty prevalent. A certain number of cases of diarrhœa and dysentery appeared in November. But the most frequent complaint in these two months was bronchitis. In January "La Grippe" seemed to take the place of every disease. Cases of bronchitis and pneumonia were very numerous in February and March. In April and May we had more cases of dyspepsia and bronchitis than of anything else. In June it was headache and dyspepsia ; in July and August diarrhœa and dysentery, and the same is true of September and October with the addition of a few cases of simple and typhoid fevers.

Typhoid Fever—But very few cases in October. Disinfection of the excreta of typhoid patients is insisted upon by the physicians.

Scarlet Fever—Almost none.

Measles—We had but very few cases and of a mild type.

Diphtheria—We have had but a few cases. Isolation and disinfection generally practiced.

General Sanitary Condition of houses infected with diphtheria—Good.

Malarial Diseases—Less.

General character—Mild.

Water Supply—Water works and wells. Good in all months of the year.

Sewage Disposal—Common cesspools, except the Putnam Manufacturing Co.'s village which has a system of sewers discharging into the river.

General Sanitary Condition of town—The same remarks I made last year can be repeated this year. The danger will come from having no proper system of sewerage to dispose of our large supply of water.

Scotland—E. D. Kimball, M.D.

Diseases specially prevalent—Bronchitis and catarrh. Many cases can be traced directly or indirectly to the Grippe.

Typhoid Fever—No case in town. Disinfection of excreta of typhoid patients is insisted upon by the physicians.

Scarlet Fever—No cases. Isolation and disinfection are usually practiced with scarlet fever patients.

Measles—A few cases—simple.

Restrictive precautions—Isolation and disinfection.

Diphtheria—No cases this year.

Malarial Diseases—Less than last year.

Water Supply—Private wells and springs. Good in all months of the year.

Sewage Disposal—Generally good.

Drainage—Good.

General Sanitary Condition of town—Good.

Sterling—Chas. N. Allen, M.D.

Diseases specially prevalent—Epidemic influenza, whooping cough, diarrhœal diseases.

Typhoid Fever—Not unusually prevalent. Disinfection of excreta of typhoid patients is, I believe, insisted upon by the physicians.

Scarlet Fever—No cases. Isolation and disinfection are usually practiced with scarlet fever patients.

Measles—None.

Diphtheria—None. Isolation and disinfection are practiced.

Malarial Diseases—Very little observed.

Water Supply—Wells and springs. Good in all months of the year.

Sewage Disposal—No system.

Drainage—No system.

General Sanitary Condition of town—Indifferent.

THOMPSON—L. HOLBROOK, M.D.

Diseases specially prevalent—In a review of the sanitary condition of this town for the year, I think there has been less sickness from any and all causes than for many years. Those diseases most prevalent, I think, have been of the respiratory organs, and and the neuroses, traceable to climatic causes, with which are mingled perhaps to some extent malarial influences.

Typhoid Fever—Has been wholly absent in the town.

Is disinfection of excreta of Typhoid patients insisted upon by the physicians?—In all cases of contagious or infectious diseases.

Scarlet Fever—Has been none.

Are isolation and disinfection usually practiced with Scarlet Fever patients?—It is the practice of our physicians to try to secure the isolation and disinfection in all cases when practicable; but a thorough and efficient enforcement of this desirable practice sometimes is impossible in crowded tenements, with limited space and ill-contrived apartments, as in some of our manufacturing villages.

Measles—No cases observed, except a few diagnosed *Rubeola spuria*, without the catarrh of true measles.

Malarial Diseases—I think less, except complicating.

General Character—Neuralgic affections.

Water Supply—By wells entirely. Good in all months of the year.

Sewage Disposal—In the village—cesspools, often cleansed. In isolated dwellings, through conductors to distances.

Drainage—Generally good.

General Sanitary Condition of town—Good.

WINDHAM—CHAS. JAMES FOX, M.D.

Diseases specially prevalent—Catarrhal inflammations, typhoid fevers, pneumonia, malarial fevers. A splendid system of sewerage is being introduced which, when fully complete, will lessen all of these affections.

Typhoid Fever—Has been unusually prevalent during September and October. It has been traced in nearly all the cases to defective sewerage and cesspools, urging an immediate system of sewerage, which, when carried out as it has been in some localities, in every way lessened at once the number of cases in that vicinity.

Is disinfection of excreta of Typhoid patients insisted upon by the physicians?—Yes, in my own, and in the practice of nearly every physician now.

Scarlet Fever—Scarlatina simplex to some extent, but no fatality.

Are isolation and disinfection usually practiced with Scarlet Fever patients?—No ; I have called attention to it in a number of cases, and after imperative orders it was generally followed. It was mostly from carelessness, and a non-realizing fact of the importance of such a step.

Measles—None to any extent during 1890.

Diphtheria—A number of cases, malignant type.

Proportion of deaths—1 to 11. Isolation and disinfection are practiced.

Facts relating to its beginning and mode of spreading—Began from defective drainage, and spread from lack of isolation in one or two cases.

General Sanitary Condition of houses infected with diphtheria.—Heretofore not good, but every year much better ; (refers to mill tenements).

Malarial Diseases—Have prevailed more than in 1889.

General character—Mostly quotidian type.

Water Supply—Excellent from Nachaug river. Good in all months of the year.

Sewage Disposal—Admirable ; naturally empties into the Willimantic river, a stream of considerable size.

Drainage—Sloping to the Willimantic river.

General Sanitary Condition of town—Excellent as to water supply ; bad as to sewage disposal, owing to sewerage system being

as yet incomplete—drainage natural to river. All these will be much better during 1891.

Woodstock—H. R. Lowe, M.D.

Diseases specially prevalent—Influenza of last winter.

Typhoid Fever—Was unusually prevalent during September and October; traced to sink drains. Disinfection of excreta of typhoid patients is insisted upon by the physicians.

Scarlet Fever—None. Isolation and disinfection are usually practiced with scarlet fever patients.

Measles—None.

Diphtheria—In a malignant form. Proportion of deaths three in five. Isolation and disinfection are practiced.

Facts relating to its beginning and mode if spreading—Came from well in cellar and school teacher spread it in school.

General Sanitary Condition of houses infected with diphtheria—Poor.

Malarial Diseases—Have prevailed less than in 1889.

Water Supply—From wells only; good in all months of the year.

Drainage—Good.

General Sanitary Condition of town—Good.

LITCHFIELD COUNTY.

Barkhamsted—John W. Bidwell, M.D.

Diseases specially prevalent—There were no diseases specially prevalent.

Typhoid Fever—Not unusually prevalent. Disinfection of excreta of typhoid patients is not insisted upon by the physicians.

Scarlet Fever—Sporadic cases, a very few and of mild type. Isolation and disinfection are usually practiced with scarlet fever patients.

Measles—A few cases of a mild type of measles. No restrictive precautions.

Diphtheria—None that I hear of; if any, very mild. No deaths.

Malarial Diseases—Do not occur.

Water Supply—From wells almost entirely. Good in all months of the year.

Sewage Disposal—Very little attention given to it.

Drainage—Very little attention paid to drainage.

General Sanitary Condition of town—Pretty good for a sparsely settled farming town. Outhouses are located with some reference to sanitary proprieties. Public sentiment is evidently influenced by modern sanitary ideas to some extent, and is growing.

BETHLEHEM—O. BROWN, M.D.

Diseases specially prevalent—Some pneumonia.

Typhoid Fever—But one case which occurred in July.

Is disinfection of excreta of Typhoid patients insisted upon by physicians in your vicinity?—Do not know.

Scarlet Fever—Cannot learn of a single case.

Measles—No cases.

Diphtheria—Can learn of but one case.

Are isolation and disinfection practiced?—Do not know. Can give no facts relating to it.

General Sanitary Condition of houses infected with diphtheria—Unknown.

Malarial Diseases—Cannot learn of any cases.

Water Supply—Wells and springs. Good in all months of the year.

Sewage Disposal—Surface.

Drainage—Surface.

General Sanitary Condition of town—Good.

(CANAAN) *or Falls Village and Vicinity*—H. E. CARTER, M.D.

Diseases specially prevalent—Diphtheria, typhoid fever, pneumonia, dysentery and one severe and well marked case of sclerosis of the liver in a gentleman 71 years old, followed by recovery.

Typhoid Fever—Not unusually prevalent. Disinfection of excreta of typhoid patients is insisted upon by the physicians.

Scarlet Fever—A few cases, mild type. Isolation and disinfection are usually practiced with scarlet fever patients.

Measles—Not many cases.

Diphtheria—A few cases malignant diphtheria ; three deaths. Isolation and disinfection are practiced.

Can you give any facts relating to its beginning and mode of spreading?—In one house due to a neglected waste pipe.

Malarial Diseases—About the same.

General Character—No well defined symptoms; might properly be called "mongrel" cases of fever and ague, for the want of any better name.

Water supply—Running spring water, wells and cisterns. Fair in all months of the year with the exception of an unusually rainy season.

Sewage Disposal—No system.

Drainage—Naturally pretty good.

General Sanitary Condition of town—Indifferent.

Cornwall—Francis S. Skiff, M.D.

Diseases specially prevalent—No prevailing diseases except epidemic La Grippe, so familiar with all.

Rare or Strange Diseases—One case ulceration of bowels; died after an illness of five months.

Typhoid Fever—Not a case to my knowledge. Disinfection of excreta of typhoid patients is insisted upon by me.

Scarlet Fever—None. Isolation and disinfection should most certainly be practiced with scarlet fever patients.

Measles—None this year.

Diphtheria—None. Isolation and disinfection are practiced.

Malarial Diseases—Have prevailed less than in 1889.

General Character—One case intermittent fever in adjoining town (Sharon).

Water Supply—Drinking water from wells and springs; washing water from cisterns. Generally good in all months of the year.

Sewage Disposal—Natural.

Drainage—Fair.

General Sanitary Condition of town—Think there is chance for improvement.

Goshen—Jos. Howard North, M.D.

Diseases specially prevalent—Influenza or catarrhal and rheumatic diseases. Causes pertaining chiefly to the meteorological conditions of the seasons, therefore not removable.

Rare or strange diseases—Nothing remarkable in my experience.

Typhoid Fever—No well-marked or severe cases in my practice, one mild case occurring in September, originating from no special source, however, the patient being a rapidly growing youth, employed as a farm laborer, and no specific infection that I could discover, and no other illness arising in the vicinity.

Is disinfection of excreta of Typhoid patients insisted upon by physicians in your vicinity?—I think it is. I always advise and direct antiseptic disposal.

Scarlet Fever—None.

Are isolation and disinfection usually practiced with Scarlet Fever patients?—Should most decidedly enforce these two important points in the prevention and stamping out of the disease.

Measles—None during past year. Have had none near us, and there was a thorough epidemic of the disease, a few years ago, which left hardly anyone unprotected so far as the having rubeola is concerned. Very few deaths could be charged to that epidemic, however.

Diphtheria—None. Isolation and disinfection should be practiced.

Malarial Diseases—We have no real malaria.

Water supply—Chiefly wells, some of which are quite shallow, and more or less surface water. Generally good in all months of the year. As a rule the people take special care of their wells, cleaning them often, and always if they seem to find anything objectionable in taste or appearance of the water; are well schooled in the matter of water supply.

Sewage Disposal—Being an agricultural town the sewage goes into the compost or manure heap, and on the land.

Drainage—Being one of the highlands of the State the drainage is wholly natural, following the water-sheds east and west into the Marshapaug, Naugatuck and Bantam streams.

General Sanitary Condition of town—Should say we rank in the division of the good, among the rural townships.

Kent—John W. King, M.D.

Diseases specially prevalent—None.

Typhoid Fever—None at all. Disinfection of excreta of typhoid patients is insisted upon by the physicians.

Scarlet Fever—No scarlet fever. Isolation and disinfection are usually practiced with scarlet fever patients.

Measles—No measles.

Diphtheria—Not any. Isolation and disinfection are practiced.

Malarial Diseases—About the same.

General Character—Bilious remittent.

Water Supply—Reservoir ; some wells, some springs. In hot weather reservoir water not very good for drinking.

Sewage Disposal—Have no sewers.

Drainage—Drainage is bad.

General Sanitary Condition of town—Indifferent.

Litchfield—F. H. Wiggin, M.D.

Diseases specially prevalent—Rheumatic.

Typhoid Fever—None. Disinfection of excreta of typhoid patients is insisted upon by the physicians.

Scarlet Fever—None. Isolation and disinfection are usually practiced with scarlet fever patients.

Measles—None.

Diphtheria—None.

Malarial Diseases—Have prevailed more than in 1889.

General Character—Quartan type. Two cases are all that I have any knowledge of and were traced to local causes.

Water Supply—Reservoir 5 miles from town. Good in all months of the year.

Sewage Disposal—None.

General Sanitary Condition of town—Indifferent.

New Hartford—Jerry Burwell, M.D.

Diseases specially prevalent—Influenza, catarrhal of mucus membrane of lungs and intestines.

Typhoid Fever—A few cases in September and October. Disinfection of excreta of typhoid patients is not insisted upon by the physicians.

Scarlet Fever—None.

Are insolation and disinfection usually practiced with Scarlet Fever patients? Attempts are made in some cases, and other cases the efforts at isolation and disinfection are crowned with success.

Measles—I think none.

Diphtheria—But little diphtheria. Isolation and disinfection are not practiced. Can give no facts relating to its beginning and mode of spreading.

General Sanitary Condition of houses infected with diphtheria—Bad.

Malarial Diseases—About the same as in 1889.

General Character—There is, as far as my knowledge extends, no cases of intermittent fever in town, and have been none this year. Other diseases have manifested evidences of malaria in their symptoms but slightly.

Water Supply—All sorts excepting artesian wells. Pretty good in all months of the year.

Sewage Disposal—But few sewers in the town.

Drainage—Generally surface.

New Milford—James Hine, M.D.

Diseases specially prevalent—La Grippe and whooping cough. Developments in former greatly varied. Much neuralgic accompaniment.

Typhoid Fever—Not a case. Disinfection of excreta of typhoid patients is not insisted upon by the physicians.

Scarlet Fever—None. Isolation and disinfection are usually practiced with scarlet fever patients.

Measles—None.

Diphtheria—Half dozen cases of average severity. One death.

Malarial Diseases—Less ; scarcely any.

Water Supply—Village supplied from a reservoir in good condition ; outside by wells and springs. Good in all months of the year.

Sewage Disposal—Into a small stream which empties into the Housatonic.

Drainage—A good and perfect system of drainage by a connected system of tile drainage in the village. Mostly on surface in agricultural portion.

General Sanitary Condition of town—Good.

Norfolk—J. C. Kendall, M.D.

Diseases specially prevalent—For a year and a half there has been far less than the average of acute sickness, as also absence

of sickness whose causes are known, and recognized as removable. Excluding "colds" and La Grippe, perhaps the largest number of cases would fall under the general head "diarrhœal," and these mostly in young children.

Rare or Strange Diseases—Only La Grippe, generally prevalent, of very mild type (no deaths). Recovery from the depression of this disease was very tardy, requiring months.

Typhoid Fever—I have heard of only one case, in September; source not traceable.

Is disinfection of excreta of Typhoid patients insisted upon by the physicians in your vicinity? Always by me. Cannot speak for others, so few cases occur here.

Scarlet Fever—I hear nothing about this topic. No cases. Isolation and disinfection are usually practiced with scarlet fever patients.

Measles—Confined to one family; type mild.

Diphtheria—No cases.

Malarial Diseases—Less, if that was possible. Simply a show of the latent malarial influence secondary to some graver depression.

Water Supply—From large, numerous, never-failing springs. Good in all months of the year.

Sewage Disposal—Human excrement into the familiar country privy. Other slops into the natural water courses.

Drainage—The undulating surface of our town has made artificial drainage unnecessary.

General Sanitary Condition of town—From the standpoint of the present, all good and satisfactory.

Plymouth—J. B. Heath, M.D.

Diseases specially prevalent—The "Grippe" and bronchitis.

Typhoid Fever—Typhoid fever has not been unusually prevalent. Disinfection of excreta of typhoid patients is insisted upon by me.

Scarlet Fever—One case. Simplex. Isolation and disinfection are usually practiced with scarlet fever patients.

Measles—No cases in my practice this year.

Diphtheria—A few cases of diphtheritic throat. No deaths. Isolation and disinfection are practiced.

Malarial Diseases—About as usual.

Water Supply—Springs and wells.

Sewage Disposal—That provided by nature and generally very efficient.

Drainage—Very good indeed.

General Sanitary Condition of town—Very good.

Roxbury—Louis J. Pons, M.D.

Diseases specially prevalent—La Grippe, catarrhal fever, pneumonia, and bronchitis, pertussis.

Typhoid Fever—Has not been unusually prevalent. Most prevalent in March. Traced to water supply. Disinfection of excreta of typhoid patients is insisted upon by the physicians.

Scarlet Fever—None.

Measles—About 8 cases, none fatal. All restrictive precautions taken.

Diphtheria—None.

Malarial Diseases—Have prevailed less than in 1889.

General Character—Chronic malarial poisoning.

Water Supply—90 per cent. wells, 10 per cent. springs, conveyed in lead pipes. Not good in all months of the year.

Sewage Disposal—Common privy vaults.

Drainage—Mostly surface or imperfectly covered drains of stone or wood. Recently, however, tile are being used, and more attention paid to drainage.

General sanitary condition of town—Generally good, but in many cases indifferent and bad.

Sharon—C. W. Basset, M.D.

Diseases specially prevalent—Measles, whooping cough.

Typhoid Fever—I do not know of a single case.

Scarlet Fever—None.

Measles—Mild type—epidemic. No restrictive precautions except through advice of attending physician.

Diphtheria—None.

Malarial Diseases—Rather less I think.

General Character—They have occurred mostly as complications of other diseases.

Water Supply—Our village is supplied from a small brook about a mile from the street. Water brought in pipes of iron

and cement. Fair in all months of the year. It is rather turbid after a shower.

Sewage Disposal—We have no sewers, nor any public method for disposing of sewage.

Drainage—Our village being situated on a hill, the surface drainage is very good.

General sanitary condition of town—Good.

THOMASTON—RALPH S. GOODWIN, M.D.

Diseases specially prevalent—Cholera infantum, pneumonia, phthisis, bronchitis and rheumatism.

Are the causes known and removable?—Some are—some are not. The cases of cholera infantum were all of them among bottle-fed children. Several cases of phthisis were developed by La Grippe, and others were accelerated or aggravated by it. Many cases of pneumonia and bronchitis were sequelæ of the "Grip." Rheumatism was unusually prevalent during the winter of 1889–90, owing to the dampness of and sudden changes in the weather.

Rare or Strange Diseases—The epidemic known as "La Grippe."

Typhoid Fever—Only two or three mild cases in September. It has not been epidemic here during the past year. In one or two instances it was traced to an out of town source. In other cases the origin could not be detected after careful search and inquiry. Disinfection of excreta of typhoid patients I think is generally now insisted upon by the physicians.

Scarlet Fever—I have not seen a case this year.

Are isolation and disinfection usually practiced with Scarlet Fever patients?—I think isolation and disinfection would be practiced here with such patients, should the disease occur. Physicians and people generally are beginning to be more particular about such precautions than formerly, and if they were neglected it would attract public attention and comment.

Measles—No measles.

Diphtheria—Here and there a case—only one death. Isolation and disinfection are practiced. Most of our cases have been brought here from out of town and have not spread.

Sanitary Condition of houses infected with diphtheria—Some good, some bad.

Malarial Diseases—About the same—very little.

General Character—Such as may be summed up in the expression "dumb ague."

Water Supply—A reservoir of ponded water from a brook and springs. Good only during the winter months.

Sewage Disposal—Two or three private sewers for accommodation of about 200 people. Cesspools and drains for the rest of the population. With very small cost it would be possible to have an excellent system of sewage disposal.

Drainage—The natural drainage is good, the town being situated mostly on a plateau elevated many feet above the Naugatuck river. The soil being sandy loam, with sand and gravel bottom, would be extremely favorable to a system of intermittent filtration, or broad irrigation for sewage disposal.

General Sanitary Condition of town—Indifferent. The sanitary condition might be greatly improved in all the above respects. But in spite of this fact, the health of the town is, and has been for many years, exceptionally good. No epidemics have visited us for many years.

Torrington—T. S. Hanchett, M.D.

Diseases specially prevalent—Those usually incident to the seasons. Often known, not always prevented. I have seen in my own and my neighbors' practice, more cases of peritonitis during last three months than for many years.

Rare or strange diseases—La Grippe in Dec., Jan. and Feb.

Typhoid Fever—A few cases in August and September. Not traced in any instance to a special source. Some of the cases were imported.

Is disinfection of excreta of Typhoid patients insisted upon by the physicians in your vicinity?—Yes, by the physicians. Perhaps not always by practitioners of special methods.

Scarlet Fever—But few cases, those mild, no throat symptoms.

Are isolation and disinfection usually practiced with Scarlet Fever patients?—Yes—this is very thoroughly attended to.

Measles—Only a few cases and those mild—not but little attention paid to them.

Diphtheria—Yes, an occasional case during fall, mild, no deaths. Isolation and disinfection are practiced.

Facts relating to its beginning and mode of spreading—As far as my observation goes, it seemed to be governed by no laws.

General sanitary condition of houses infected with Diphtheria—Some perfect, some bad.

Malarial Diseases—More just now than last year.

General Character—Intermittent form.

Water Supply—Crystal Lake, 1½ miles north, by iron pipes to the borough. Wells among farmers outside. Not so pleasant in July and August.

Sewage Disposal—Public sewers empty into Naugatuck river below and back of town, for the borough. On the hills, same as other farming districts.

Drainage—Good.

General Sanitary Condition of town—Good.

Warren—J. B. Derrickson, M.D.

Diseases specially prevalent—None.

Typhoid Fever—Not any.

Scarlet Fever—Not any.

Measles—None.

Diphtheria—Not any.

Malarial Diseases—No malaria.

Water Supply—Springs and wells. Good in all months of the year.

Sewage Disposal—We design to have it covered.

Drainage—Fair.

General Sanitary Condition of town—The health of the town was never better. There has been but little acute sickness. In the winter and spring La Grippe prevailed with its secondary troubles. Since then very little sickness.

Washington—Orlando Brown, M.D.

Diseases specially prevalent—None.

Scarlet Fever—But few mild cases. Isolation and disinfection are usually practiced with scarlet fever patients.

Measles—No cases.

Diphtheria—But few mild cases. Isolation and disinfection are practiced.

General Sanitary Condition of houses infected with diphtheria—Good.

Malarial Diseases—Less prevalent than in 1889.

Water Supply—Wells and springs. Good in all months of the year.

Sewage Disposal—Surface.

Drainage—Surface.

General Sanitary Condition of town—Good.

Watertown—Walter S. Munger, M.D.

Diseases specially prevalent—La Grippe.

Typhoid Fever—Not unusually prevalent. Disinfection of excreta of typhoid patients is insisted upon by the physicians.

Scarlet Fever—Two cases imported by fresh air children from New York. Isolation and disinfection are usually practiced with scarlet fever patients.

Measles—None.

Diphtheria—Very little. One case (fatal), imported from New York. Isolation and disinfection are practiced.

Malarial Diseases—Have prevailed more than in 1889.

General Character—A few cases of intermittent, and one or more of remittent.

Water Supply—Mostly wells. Good during most of the year.

Sewage Disposal—Into or onto the ground, and "out of the way."

Drainage—Our town is hilly and easily drained.

General Sanitary Condition of town—I think pretty good.

Winchester—John W. Bidwell, M.D.

No diseases specially prevalent.

Typhoid Fever—We have none this year.

Scarlet Fever—Very scarce and very mild. Isolation and disinfection are usually practiced with scarlet fever patients.

Measles—Measles very rare, and of mild type. It is not uncommon for parents to send their children purposely into houses where it is running mild, so they may have the disease while young, "and be done with it."

Diphtheria—At beginning of year 5 or 6 cases in 3 or 4 families. All fatal. Isolation and disinfection are practiced.

Facts relating to its beginning and mode of spreading—In every case the causes were local, evidently so.

General Sanitary Condition of houses infected with diphtheria—Bad.

Malarial Diseases—Have prevailed less than in 1889.

Water Supply—From the Lake and good generally. It is not as palatable in spring, especially during the months of May and June.

Sewage Disposal—Is by drainage through tile, to an open rapid stream through the borough, which is flushed by manufactories in the day, as well as every dash of rainfall.

Drainage—Good.

General Sanitary Condition of town—Good.

Every one seems to have an idea that some regard to sanitary conditions is imperative for the health of the people, and a corresponding improvement in sewage disposal and drainage is noticeable.

Woodbury—H. W. Shove, M.D.

Diseases specially prevalent—Whooping cough is prevalent. Most of the cases are complicated with bronchitis.

Typhoid Fever—I do not think there has been a case in town the last year. Disinfection of excreta of typhoid patients is insisted upon by the physicians.

Scarlet Fever—Only a few cases of the simple type. Isolation and disinfection are practiced by all prudent persons who have charge of such patients.

Measles—None in town.

Diphtheria—None prevailing.

Malarial Diseases—Have prevailed more than in 1889.

General Character—Most of them are of the tertian type.

Water Supply—From wells and springs, good in all months of the year.

Sewage Disposal—Mostly surface disposal.

Drainage—No system.

General Sanitary Condition of town—Good.

MIDDLESEX COUNTY.

Chatham (East Hampton)—Albert Field, M.D.

Diseases specially prevalent—Catarrhal, gastro-enteric and bronchial. Probably atmospheric, combined with carelessness in regard to underclothing and in eating, at least that has been my experience.

Typhoid Fever—Not unusually prevalent. There have been a few cases of fever, all occurring in two houses, both under very unsanitary conditions. These cases have been called typhoid by attending physicians ; what I saw of them impressed me with the belief that they were all remittent fever. These are all the cases of fever in this vicinity, and they have all been in the months of September and October. Disinfection of excreta of typhoid patients is not insisted upon by the physicians.

Scarlet Fever—None.

Measles—None.

Diphtheria—None.

Malarial Diseases—Seemingly less.

Water Supply—Mostly wells. As good as wells generally, in all months of the year.

Sewage Disposal—As usual in country places, the top of the ground.

Drainage—Good, owing to lay of the land.

General Sanitary Condition of town—Indifferent.

Chester—S. W. Turner, M.D.

Diseases specially prevalent—Pneumonia and typhoid following "La Grippe." More diarrhœal diseases among adults, less among children. During September and October an epidemic of colds with diarrhœa, in many cases resembling the influenza of last winter.

Rare or Strange Diseases—La Grippe, very extensive, leaving patients in bad condition, with slow recovery.

Typhoid Fever—Has been unusually prevalent.

Most prevalent—In November, 1889, August, September and October, 1890.

Has it been traced in any instance to a special source?—One family, child of thirteen years died October 4th, after three weeks'

sickness. Within ten days, the mother and another child of eight were attacked. Now on third week and not yet out of danger. Low ground, with cellar generally damp and unhealthy surroundings. Water bad during the summer. After first attack no better water and not previously boiled. Other children of the family removed after the second was taken down. Disinfection of excreta of typhoid patients is always insisted upon by the physicians.

Scarlet Fever—None, or only in one family, so mild as hardly to be noticed. Isolation and disinfection are practiced, as far as possible, with scarlet fever patients.

Measles—None.

Diphtheria—None.

Malarial Diseases—About the same.

General Character—Rarely marked chills; much rheumatic pain.

Water Supply—Wells, and water from springs.

Is the water supply good?—Sometimes during the fall months low and not pure.

Sewage Disposal—The ground; occasionally that abomination, the cesspool. It is rarely found, however.

Drainage—Fair.

General Sanitary Condition of town—Good.

Clinton—H. S. Reynolds, M.D.

Diseases specially prevalent—Pneumonitis, malaria, tonsilitis.

In regard to question No. 6, I would state that many cases of tonsilitis and follicular pharyngitis that have occurred have been improperly called diphtheria. These cases upon investigation have all recovered. Other cases of the most malignant type of diphtheria have been diagnosed tonsilitis, etc., all of which have died. The skill and honor of saving all having diphtheria must certainly rest upon a very few.

Typhoid Fever—Has not been unusually prevalent.

Is disinfection of excreta of Typhoid patients insisted upon by the physicians in your vicinity?—It is always insisted upon by Dr. Webb and myself but whether by the other local physicians I am unable to say.

Scarlet Fever—None that I am aware of. Isolation and disinfection are always practiced by the two above named physicians with scarlet fever patients.

Measles—None I have heard about.

Diphtheria—A few cases of the malignant type.

Proportion of deaths—Fully 50 per cent. Isolation and disinfection are practiced in most cases. Can give no facts relating to its beginning and mode of spreading.

General Sanitary Condition of houses infected with diphtheria—As good as the average in the country places.

Malarial Diseases—About the same.

Character—Generally mild.

Water Supply—Wells and cisterns. Generally good in all months of the year.

Sewage Disposal—Cesspools. On the surface.

Drainage—Natural but rather poor.

General Sanitary Condition of town—Not very good.

Cromwell—J. Francis Calef, M.D.

Diseases specially prevalent—Influenza; some typhoid this fall. Causes of the latter disease known, but not always removable. I know no way of compelling a man to remove privy and wash house from near well, or to have that well thoroughly cleaned save by united action of the Health Board. Last summer I directed an old well to be cleaned out, and I am informed that when completed leather straps and bones protruded from the mud in the bottom. Yet it was reported as having been *cleaned.* In that house have originated five cases of typhoid fever this fall, as was predicted if the well were not cleaned and the surrounding soil thoroughly purified. I now advise removal of the well to a soil that is not saturated with filth.

Typhoid Fever—Was unusually prevalent in September and October.

Special source—To two sources in this town. First, an extemporized duck pond in a ravine in the north part of the town. Two mild and unrecognized cases of typhoid (not in my practice at first) ran their course in September near this little pond, and the discharges were deposited without disinfection on a sandy soil about fifty feet directly above the pond. Eight cases of typhoid were traced to this source, and two deaths (due to complications). Five cases and one death (from imprudence) were traced to the well aforesaid. Several other cases were not traced to any source.

Is disinfection of excreta of Typhoid patients insisted upon by the physicians in your vicinity?—It is by me, but I find it often neglected.

Scarlet Fever—None.

Are isolation and disinfection usually practiced with Scarlet Fever patients?—Always, most carefully by me, and in this the families always coöperate.

Measles—A few cases in early part of year. All these cases originated elsewhere save one. I direct isolation and put patients up stairs if practicable. Same care as to doorways as in diphtheria.

Diphtheria—Some, mild; no deaths. Isolation and disinfection strictly practiced.

Facts relating to its beginning and mode of spreading—This year cases seem all to have originated in one school in healthy location.

General Sanitary Condition of houses infected with diphtheria—As good as the average. I always keep diphtheria isolated in empty room with sheet over door wetted in permanganate of potash and corrosive sublimate solution.

Malarial Diseases—Less in pronounced form.

General Character—Assuming a continued type and run about seven days in spite of full doses of quinine, etc.

Water Supply—Wells and springs; a few use rain water for drinking.

Is the Water Supply good?—Bad in July, August and September.

Sewage Disposal—Generally deposited on soil more or less remote from dwelling.

Drainage—Very poor in the portions of the town visited this year by typhoid. It is very hard to make the average farmer carry his drain far enough from the house or keep it properly cleaned out.

General Sanitary Condition of town—Good in most parts; bad in a few outlying sections.

Durham—R. W. Mathewson, M.D.

Diseases specially prevalent—No epidemic of contagious diseases.

Rare or Strange Diseases—Epidemic influenza.

Typhoid Fever—Has not been unusually prevalent.

Scarlet Fever—None.
Measles—None.
Diphtheria—None severe ; not epidemic.
Malarial Diseases—About the same.
General Character—Mild.
Water Supply—North part of the town, supply aqueduct.
General Sanitary Condition of town—Fairly good.

East Haddam—Matthew W. Plumstead, M.D.

Diseases specially prevalent—Malarial diseases. Causes not removable at present.

Please state additional particulars of interest—During the spring we had an epidemic of La Grippe from which hardly any escaped. It seemed to center in Moodus, where I had some fifty (50) cases of a severe type. As a result there were a larger number of cases of pneumonia. It left quite a number with chronic throat and lung troubles. During the summer months I had an extra number of cases of acute dysentery. This fall there has been an unusual amount of throat and lung troubles as a result of the epidemic in the spring.

Typhoid Fever—No cases here this year.

Scarlet Fever—No cases. Isolation and disinfection are usually practiced with scarlet fever patients.

Measles—I had no cases.

Diphtheria—No cases here this year.

Malarial Diseases—Have prevailed more than in 1889.

General Character—Remittent type.

Water Supply—Principally from wells. Good in all months of the year.

Sewage Disposal—Mostly in closets, which are attended to every year, and used on the land.

Drainage—Is very good.

General Sanitary Condition of town—Good.

Essex—Anonymous.

Diseases specially prevalent—Epidemic influenza in January and February. Three cases of typhoid fever—two of them fatal—occurred during the latter part of last year. Am unable to give particulars concerning them, but am informed that bad drainage was supposed to have existed as a causative factor.

Typhoid Fever—Know of but one case this fall; in October. The case referred to was an imported one of moderate severity, I am told. The case above mentioned was under the professional care of Drs. Bidwell, of Deep River, and Granniss, of Saybrook, and very possibly is worthy of special mention. Disinfection of excreta of typhoid patients is insisted upon by the physicians.

Scarlet Fever—Have had none. Isolation and disinfection are practiced with scarlet fever patients.

Measles—Do not know of any cases.

Diphtheria—Have had none.

Malarial Diseases—Less.

General Character—Mild.

Water Supply—Chiefly from wells. Fair in all months of the year.

General Sanitary Condition of town—Good.

Haddam—M. C. Hazen, M.D.

Diseases specially prevalent—None. The year has been unusually healthy, the average age of deaths past year 74⅔.

Typhoid Fever—Only a very few cases. Disinfection of excreta of typhoid patients is insisted upon by the physicians.

Scarlet Fever—Very few cases. Isolation and disinfection, I think, are usually practiced with scarlet fever patients.

Measles—None.

Diphtheria—A few sporadic cases. Isolation and disinfection are practiced.

Malarial Diseases—Much less frequent.

General Character—Chronic form mostly.

Water Supply—Wells mostly. Good in all months of the year.

General Sanitary Condition of town—Good.

Haddam (Higganum)—Le Roy A. Smith, M.D.

Diseases specially prevalent—La Grippe, the only prevalent disease past year.

Typhoid Fever—Has not been enough to tell when most prevalent. Has not been traced in any instance to a special source.

Is disinfection of excreta of typhoid patients insisted upon by the physicians in your vicinity?—Cannot tell in all cases.

Scarlet Fever—None. Isolation and disinfection, I think, are usually practiced with scarlet fever patients.

Measles—None.

Diphtheria—Some; mild type. No deaths. Far as I know isolation and disinfection are practiced.

General Sanitary Condition of house infected with diphtheria—Usually bad.

Malarial Diseases—Less than in 1889.

General Character—Milder.

Water Supply—Wells mostly. Good in all months of the year.

Sewage Disposal—Top of ground largely.

Drainage—Not as good as ought to be.

General Sanitary Condition of town—Good.

KILLINGWORTH—E. P. NICHOLS, M.D.

Diseases specially prevalent—Very little sickness since the Grippe left us.

Typhoid Fever—One case in September. The young man had been taking a vacation, riding about the country, came home with rheumatism, and it might be called a case of typhoid malaria, rather than genuine typhoid fever.

Scarlet Fever—One case imported from Brooklyn, N. Y.

Measles—One mild case.

Diphtheria—None.

Malarial Diseases—Less than in 1889.

Water Supply—Wells. Good in all months of the year.

Sewage Disposal—Cesspools.

MIDDLEFIELD—R. W. MATHEWSON, M.D.

Diseases specially prevalent—Epidemic influenza. Town has been unusually free from epidemic or contagious diseases.

Typhoid Fever—Has not been unusually prevalent.

Scarlet Fever—None.

Measles—None.

Diphtheria—None as an epidemic.

Malarial Diseases—About the same.

Water Supply—Springs and wells. Fairly good in all months of the year.

General Sanitary Condition of town—Good.

Old Saybrook—John H. Granniss, M.D.

Diseases specially prevalent—None.

Typhoid Fever—Four cases.

Most prevalent?—October. Has not been traced in any instance to a special source. Disinfection of excreta of typhoid patients is insisted upon by the physicians.

Scarlet Fever—Eight cases. All mild but one. Isolation and disinfection are usually practiced with scarlet fever patients.

Measles—None.

Diphtheria—None. Isolation and disinfection are practiced.

Malarial Diseases—Less prevalent.

General Character—Mild.

Water Supply—Wells—good in all months of the year.

Sewage Disposal—Each in his own way. Some cesspools, and by many sewage is collected and frequently distributed on the fields.

General Sanitary Condition of town—Good.

Portland—J. L. Gardner, M.D.

Diseases specially prevalent—Malarial. Causes can be removed in part. River fogs and damp quarry holes, as well as excessively muddy streets, can be plainly defined as causative influences toward malarial diseases here.

Rare or strange diseases—None, except the "Grip" and its sequelæ, typhoid fever, in September. Only a few isolated cases. Has not been traced in any instance to a special source. Disinfection of excreta of typhoid patients is insisted upon by the physicians.

Scarlet Fever—None, as reported.

Measles—Rubeola and German measles.

Diphtheria—Very rare. A few cases. No epidemic. Isolation and disinfection are practiced.

Facts relating to its beginning and mode of spreading—Cesspools and bad cellar drainage.

Malarial Diseases—More prevalent, I think.

General Character—Chills and fever. Remittent and intermittent varieties.

Water Supply—Brook reservoir. Good, we think, in all months of the year, although tested but one season as yet.

Sewage Disposal—Bad. No regular system of drainage.

General Sanitary Condition of town as regards water supply, good ; *sewage disposal*, bad; and *drainage*, bad.

SAYBROOK (DEEP RIVER)—E. BIDWELL, M.D.

Diseases specially prevalent—The general prevailing influenza during the winter months; catarrhal troubles during the year.

Typhoid Fever—A few cases of a mild type during the fall months. Has not been traced in any instance to a special source. No deaths. Disinfection of excreta of typhoid patients is insisted on by the physicians.

Scarlet Fever—A few cases of a mild type. No deaths. Isolation and disinfection are usually practiced with scarlet fever patients.

Measles—None.

Diphtheria—None.

Malarial Diseases—About the same.

Water Supply—Wells. Fair in all months of the year.

Sewage Disposal—Disposed of mostly as a fertilizer.

Drainage—Good.

General Sanitary Condition of town—Fairly good.

WESTBROOK—T. B. BLOOMFIELD, M.D.

Diseases specially prevalent—Diarrhœal diseases. The causes supposed to have been the very damp season, and perhaps the great amount of surface water, throughout the warm weather.

Rare or strange diseases—Have a case on hand of "Mollities Ossium" in the female, three years after birth of last child.

Typhoid Fever—None here. Disinfection of excreta of typhoid patients is always insisted upon by the physicians.

Scarlet Fever—None. Isolation and disinfection are always practiced with scarlet fever patients.

Measles—None.

Restrictive precautions—The same as in other types of children's diseases. Isolation always, and disinfection.

Diphtheria—Four cases last December. Two deaths (50 per cent.) Isolation and disinfection are practiced.

Facts relating to its beginning and mode of spreading—Imported.

General Sanitary Condition of houses infected with diphtheria—Very good.

Malarial Diseases—About the same.

General Character—Intermittent fever in every case, so far as known.

Water Supply—From wells. Generally good in all months of the year. Last summer not good, owing to large amount of rainfall.

Sewage Disposal—Generally on the surface.

Drainage—None.

General Sanitary Condition of town— Indifferent.

TOLLAND COUNTY.

Andover—E. P. Flint, M.D. (So. Coventry).

Diseases specially prevalent—The only epidemic was of the influenza. There was nothing especially noteworthy as regards prevalence or character. During the year there were several cases of pharyngitis, but no cases of especial severity, and probably none were genuine diphtheria. Inflammatory diseases of the digestive tract during the warm months were less prevalent than in former years. There has been an unusually small amount of sickness.

Typhoid Fever—None.

Scarlet Fever—None.

Measles—None.

Diphtheria—None.

Malarial Diseases—None.

Water Supply—Wells. Good in all months of the year.

Sewage Disposal—Surface drainage.

Drainage—Naturally good.

General Sanitary Condition of town—Good.

Bolton—Charles F. Sumner, M.D.

Typhoid Fever—Has not been unusually prevalent. Most in July, August and September. We have but very few cases of typhoid fever compared with years ago. Disinfection of excreta of typhoid patients is not rigidly insisted upon by the physicians.

Scarlet Fever—Mild ; but few cases. Isolation and disinfection are usually practiced with scarlet fever patients.

Measles—A few cases in west part of the town ; mild form. No deaths.

Diphtheria—Mild ; no deaths. Isolation and disinfection are practiced.

General sanitary condition of house infected with diphtheria—Not good.

Malarial Diseases—Less.

Water Supply—From wells for household purposes mostly ; from springs and streams for stock, etc. Good in all months of the year unless in very dry season for a short time.

Sewage Disposal—Ordinary for country.

Drainage—Fair.

General Sanitary Condition of town—Good.

Columbia—W. D. Waller, M.D.

Diseases specially prevalent—La Grippe, pneumonia and pleuro-pneumonia. No deaths from above named diseases ; time of prevalence, February, March and April.

Typhoid Fever—No cases. Disinfection of excreta of typhoid patients would be, if any case occurred, insisted upon by the physicians.

Scarlet Fever—There have been no cases.

Are isolation and disinfection usually practiced with Scarlet Fever patients ?—Would be as strictly as in small-pox in case of its appearance.

Measles—No cases.

Diphtheria—Not a case.

Malarial Diseases—Not a case.

Water Supply—Chiefly from wells and springs. Generally good all months of the year.

Sewage Disposal—No general system ; excreta generally used for fertilizing purposes.

Drainage—On account of the hilly condition of the town the surface drainage is generally good. Most of the cellars are furnished with good drainage.

General Sanitary Condition of town—As good as the average farming town. In visiting the sick and examining surroundings have found four places where the privy and the discharge from

sink were in such close proximity to the well as to be dangerous. Have directed suitable change which was readly complied with.

Coventry—Henry S. Dean, M.D.

Diseases specially prevalent—There was not an unusual amount of sickness in town before the epidemic of La Grippe commenced. Cases of this disease were very common during January, February and March, whole households in some instances being sick at the same time. It rarely proved fatal. It hastened, however, the fatal ending of one case of Bright's disease and of two or three cases of tubercular disease. During the same months there occurred a few cases of pneumonia. Cases of pharyngitis and bronchitis were not infrequent. During the summer and early autumn there were a good many cases of infantile diarrhœa and a few of real cholera infantum.

Typhoid Fever—There were few if any cases at any time. Not traced in any instance to a special source. Disinfection of excreta of typhoid patients is, I think, insisted upon by the physicians.

Scarlet Fever—No cases.

Are isolation and disinfection practised with Scarlet Fever patients?—Disinfection is practiced; isolation has not been practiced.

Measles—No cases.

Diphtheria—No cases except possibly mild ones. No deaths. Isolation and disinfection not practiced. Can give no facts relating to its beginning and mode of spreading.

General Sanitary Condition of houses infected with diphtheria—Comparatively good.

Malarial Diseases—Less prevalent.

General Character—Mild.

Water Supply—An aqueduct conveys water from Lake Wangumbaug to the upper part of the village of South Coventry. Many houses in town are supplied with spring water by means of pipes, too many of which are lead. A good well is to be found near most houses. Good in all months of the year.

Sewage Disposal—Like that in other country towns.

Drainage—Mostly surface.

General Sanitary Condition of town—Comparatively good.

Ellington—J. A. Warren, M.D.

Diseases specially prevalent—None.

Typhoid Fever—Not unusually prevalent. Most in October. Has not been traced in any instance to a special source. Disinfection of excreta of typhoid patients is insisted upon by the physicians.

Scarlet Fever—None. Isolation and disinfection are usually practiced with scarlet fever patients.

Measles—None.

Diphtheria—None.

Malarial Diseases—Less prevalent.

Water Supply—Aqueduct. Good in all months of the year.

Sewage Disposal—None.

Drainage—Fair.

General Sanitary Condition of town—Indifferent.

Hebron—Cyrus H. Pendleton, M.D.

Diseases specially prevalent—None except La Grippe in January, 1890.

Typhoid Fever—Has not been unusually prevalent. Most in August and September. The first case came from Willimantic the last of July. There were two subsequent cases in the same family of a mild grade, comparatively. Disinfection of excreta of typhoid patients is insisted upon by the physicians.

Scarlet Fever—Has been none during the year. Isolation and disinfection are practiced as far as practicable with scarlet fever patients.

Measles—No cases.

Restrictive precautions—None to speak of except in those along in years, in as much as it is a disease a person has but once and it is popularly supposed to be safer to have it when young and at home with parents, than under other circumstances.

Diphtheria—A few mild sporadic cases. No deaths. Isolation and disinfection not fully practiced. Can give no facts relating to its beginning and mode of spreading.

General Sanitary Condition of houses infected with diphtheria—Fair, as far as I know.

Malarial Diseases—Less prevalent.

General Character—Intermittent and remittent.

Water Supply—From wells. Good in nearly all months of the year.

Sewage Disposal—Upon the surface of the ground, into cesspools, or onto compost heaps.

Drainage—Surface drainage.

General Sanitary Condition of town—From fair to good.

Mansfield—F. E. Johnson, M.D.

Diseases specially prevalent—La Grippe, bronchitis and pneumonia during winter and spring.

Typhoid Fever—One case only. Has not been traced to a special source. Disinfection of excreta of typhoid patients is insisted upon by physicians.

Scarlet Fever—A few cases. Two deaths. Isolation and disinfection are usually practiced with scarlet fever patients.

Diptheria—A few cases, mild type. No deaths. Isolation and disinfection are practiced.

Facts relating to its beginning—Caused by foul drains, confined to one house.

Malarial Diseases—No cases.

Water Supply—Wells and springs. Good in all months of the year.

Sewage Disposal—Cesspools and on the surface.

Drainage—Good.

General Sanitary Condition of town—Good.

Mansfield—E. G. Sumner, M.D.

Diseases specially prevalent—None except La Grippe. The Grippe has been very prevalent, but few, if any, fatal cases attributed to that disease. One of our physicians says he has had 172 cases of La Grippe. Some must have been very mild, and in some years would have been called influenza or some other familiar term.

Typhoid Fever—Has not been unusually prevalent. Disinfection of excreta of typhoid patients is insisted upon by the physicians.

Scarlet Fever—Two cases in October, both proved fatal. One case lived about 3 days, one about seven days. Isolation and

disinfection are not strictly practiced with scarlet fever patients. The above two cases were buried without any funeral, and the local Board of Health examined the premises ; cases about one-half mile apart, and about one week intervened between the two deaths. In both cases the sink drain emptied too near the well, and in the latter case the water was probably contaminated.

Measles—One or two mild cases.

Restrictive precautions—None needed.

Diphtheria—Only mild cases. No deaths. Isolation and disinfection partially practiced.

Malarial Diseases—Certainly no more prevalent.

General Character—Mild.

Water Supply—Mostly from wells ; a few from springs in iron and lead pipes. Good in all months of the year.

General Sanitary Condition of town—Very good except sink drains are in quite a number of cases too near the wells, so near that I think they affect the water.

Somers (Hazardville)—S. W. Houghton, M.D.

Diseases specially prevalent—Diarrhœa. Typhoid fever.

Typhoid Fever—Has been unusually prevalent; more than for the past twelve years, in September and October. Traced to the custom of all country houses, allowing the sink spout to discharge under the windows of sleeping rooms, and permitting the exudations therefrom to lie exposed to the rays of the sun during dog days. In many places this has been allowed for fifty years or more without ever having been cleaned away. Disinfection of excreta of typhoid patients is insisted upon by the physicians.

Scarlet Fever—Not any. Isolation and disinfection are usually practiced with scarlet fever patients.

Measles—Not any.

Diphtheria—Mild type. Isolation and disinfection are practiced.

General sanitary condition of houses infected with diphtheria—With diphtheria every one is ready to do as the doctor recommends.

Malarial Diseases—Less prevalent than in 1889.

Water supply—From wells. Not good in all months of the year.

Sewage Disposal—Top of dooryards.
Drainage—Not any.
General Sanitary Condition of town—Bad.

STAFFORD—C. B. NEWTON, M.D.

Diseases specially prevalent—Whooping cough and influenza during past winter. Whooping cough has never been regarded as a disease to be especially shunned, but that children are to have the disease some time during their lifetime. Parents should be taught that it is a preventable disease, an avoidable accident; that some baby or child will fall a victim to complications which will arise occasionally with neglect. They should be taught that it is a criminal act to send their children to school having this disease; upon the street cars or public places. It is in this way that contagious diseases are scattered over the country.

Typhoid Fever—Has been unusually prevalent. Mild type. During September and October. Has been traced to cesspools. Disinfection of excreta of typhoid patients is insisted upon by the physicians.

Scarlet Fever—Few cases. I believe no fatal cases. Isolation and disinfection are usually practiced with scarlet fever patients.

Measles—Only a few cases. Mild type.

Restrictive precautions—None by the people.

Diphtheria—None. Isolation and disinfection are practiced.

General sanitary condition of houses infected with diphtheria—Good in some cases. Generally in families living in rather a primitive way, hot rooms; cold, damp, unventilated sleeping rooms; exposure to cold and dampness, with feet and body poorly protected. Prevalent here most in cold months.

Malarial Diseases—Less prevalent.

General Character—Generally of a mild type and tonsilar.

Water Supply—From an unusually pure source, from a barren section, the water-shed being a barren pasture and wood land, and from springs feeding the stream; good in all months of the year.

Sewage Disposal—Generally our sewage is drained off into the river from the principal streets. Is a steep incline into the river near. Has a rapid current.

General Sanitary Condition of town—On most of the streets, good; on some of the back streets, no sewers yet opened, but they depend upon those abominable cesspools which are in vicin-

ity of the well of course, as well as the privy. Another nuisance, because neglected, in some houses here there is the same nastiness of person, house, and surroundings as is found in all manufacturing villages among the lowest class who have not lived long enough among enlightened people to correct their habits.

Tolland—W. N. Simmons, M.D.

Diseases specially prevalent—None.

Rare or strange Diseases—"La Grippe" during the epidemic was generally prevalent, and mostly of a mild type.

Typhoid Fever—Only know of one case, in August. Was traced in this instance to drinking water from an old well, that the water had not been used for drinking purposes for six years. This patient drank large quantities of it while cutting hay on this farm, which was not occupied by a tenant, and thought it "first rate" because it was "cold." A sample from well under microscope revealed typhoid germs. Disinfection of excreta of typhoid patients is insisted upon by the physicians.

Scarlet Fever—Have known of no cases. Isolation and disinfection are usually practiced with scarlet fever patients.

Measles—No cases.

Diphtheria—One case. Mild type. No deaths. Isolation and disinfection are practiced. This case was confined. No outbreak.

General Sanitary Condition of houses infected with diphtheria—At this house the sink drainage was carried through a wooden box, within four feet of well, under the ground, and was found to be badly rotted, so sewerage had no trouble in finding well.

Malarial Diseases—More prevalent.

General Character—Chills and fever.

Water Supply—Mostly dug wells. "Tolland street" is supplied by aqueduct water and wells; good in all months of the year.

Sewage Disposal—Mostly surface. Some cesspools, which are cleaned out occasionally.

Drainage—Mostly surface. Some tile.

General Sanitary Condition of town—Good.

Union—Wm. Richardson, M.D.

Diseases specially prevalent—None.

Rare or Strange Diseases—Influenza.

Typhoid Fever—Knew of it in only one family, in October. Was not traced to a special source. Disinfection of excreta of typhoid patients is, I think, insisted upon by the physicians.

Scarlet Fever—Mild. Knew of it in only one family.

Are isolation and disinfection usually practiced with scarlet fever patients—Cannot say.

Measles—Knew of no cases.

Diphtheria—Think there were no genuine cases.

Malarial Diseases—Less prevalent.

Water Supply—Springs and wells ; good in all months of the year.

Sewage Disposal—As usual on farms.

General Sanitary Condition of town—As good as country towns in general.

Vernon—A. R. Goodrich, M.D.

Diseases specially prevalent—None. Cholera infantum during the summer months was very prevalent and some eight deaths occurred in the whole town, caused, I think, by surface drainage.

Rare or Strange Diseases—One year ago the epidemic called "La Grippe" prevailed to an alarming extent. Nearly every one came under its influence, and the results are plainly seen at the present time as influencing the results upon other diseases, particularly pneumonia, which in many cases has terminated in consumption where there is a predisposition to that disease. About twenty-five persons have died of consumption in this town the past year.

Typhoid Fever—Has not been unusually prevalent. Most in July and August. Has not been traced in any instance to a special source. Typhoid fever has been less prevalent than in former years, and most cases of a mild character. No cause could be found to produce the disease. The cases have been sporadic. Disinfectants were freely used in all cases and the excreta in all cases was treated by disinfectants, and this cause with perfect isolation has prevented its spreading.

Scarlet Fever—Only a few cases of scarlatina of mild type have occurred and isolation has been insisted upon, and disinfection of excreta insisted upon. No deaths.

Measles—Only a few cases.

Restrictive precautions—All children have been quarantined at home, which has prevented its spreading.

Diphtheria—Rather more cases than usual. Mild type. Four deaths in all. Isolation and disinfection are practiced.

Can you give any facts relating to its beginning and mode of spreading?—Diphtheria prevailed to a certain extent during the spring months, and some four or five deaths recorded. One case in particular I desire to report in full. A child of some twelve years of age came down with the usual symptoms, extreme redness, and swelling of tonsils and covered with a thick deposit, which soon assumed a croup form, great difficulty of breathing, restlessness and high fever. All remedies failed to give relief. She was then placed in a small room, all furniture removed and steam turned on from the radiator, filling the room completely, temperature standing from 88° to 90° all the time, and also breathing the vapor from slacking lime. In this condition she was kept for nearly four days. If the steam and heat subsided all the symptoms returned with the croupy cough, restlessness, and when the steam and heat were restored she would fall into a quiet sleep. With the usual remedies she made a rapid recovery. Disinfectants were freely used, paper removed from walls and sulphur freely burned to destroy all germs of the disease.

Two double houses with four families living in them, had an outbreak of diphtheria. One fatal case. When an examination was made the cellars were found filled with water to the depth of ten to twelve inches. A drain was ordered dug which soon, with the free use of disinfectants, set things all right. There have been only four deaths recorded.

General sanitary condition of houses infected with diphtheria—Poor.

Malarial Diseases—Malarial disease has prevailed to a considerable extent, but not as much as in former years. Old chronic cases.

Water Supply—From wells and springs, and of good quality. Good in all months of the year.

Sewage Disposal—Surface.

Drainage—Surface.

General Sanitary Condition of town—In the city of Rockville limited. Sewage disposal mostly surface. Bad.

Rockville is partially supplied by the Rockville Aqueduct Co. from Snipsic Lake; water good. The quantity will have to be materially increased to meet the demands of the increase in pop-

ulation of the city. The supply is ample for all purposes. The sewage in most parts of the city flows into the streets, the effect of which is not agreeable. A general system of underground sewerage is near at hand, which will very much improve the sanitary condition of the city.

Willington—F. E. Johnson, M.D.

Diseases specially prevalent—There have been no diseases specially prevalent.

Typhoid Fever—But one case. Not traced to a special source. Disinfection of excreta of typhoid patients is insisted upon by the physicians.

Scarlet Fever—No cases. Isolation and disinfection are usually practiced with scarlet fever patients.

Measles—No cases.

Diphtheria—No cases.

Malarial Diseases—No cases.

Water Supply—Wells, mostly. Very good in all months of the year.

Sewage Disposal—Surface, mostly.

Drainage—Surface.

General Sanitary Condition of town—Good.

Of the 168 Towns in Connecticut we have reports from 143 through special sanitary correspondents. This is an increase over the reports last year, when only 120 towns responded to the circular of enquiry.

In Hartford	County,	25	of the	29	towns	have	reported.
In New Haven	"	20	"	26	"	"	"
In New London	"	15	"	21	"	"	"
In Fairfield	"	21	"	23	"	"	"
In Windham	"	all	"	15	"	"	"
In Litchfield	"	20	"	26	"	"	"
In Middlesex	"	14	"	15	"	"	"
In Tolland	"	all	"	13	"	"	"

A total of 143 towns responding, out of a possible 168.

The circular containing the interrogatories upon which information was desired will be found on page 47.

Either under the first or second questions the majority of correspondents mention epidemic "Influenza." And it does not appear from the replies to these enquiries that there have been any other wide-spread or fatal diseases in epidemic form. Several correspondents mention the prevalence of some local epidemic of limited extent and of mild character, such as whooping cough, or measles. It is, however, to be noted that frequent mention is made of the acute diseases of the pulmonary organs as occurring with frequency, particularly pneumonia and bronchitis. And the monthly mortality reports indicate with still more emphasis the general and fatal prevalence of these affections.

In respect to the questions relating to Typhoid Fever the answers are very generally given. Twenty-one correspondents distinctly affirm that in the towns they respond for, the disease has been unusually prevalent. The other replies are not all so direct, but 119 give the impression or directly assert that it has not been unusually prevalent. The mortality reports as published in the Monthly Bulletin however, show that there has been a slightly greater prevalence of the disease than usual. Only in a very few instances have outbreaks of this fever, been satisfactorily traced to their sources. It is gratifying to note that our correspondents almost uniformly claim that the disinfection of the excreta is continually practiced.

There is good reason for the suspicion, however, that real effective disinfection is not as often accomplished as the answers of correspondents would indicate. There is a real disinfection and there is a spurious disinfection.

The replies of correspondents would indicate that the prevalence of Measles and Scarlet Fever has been not only limited in extent but the outbreaks have been mild in character.

Diphtheria.

Of the 145 correspondents who reply to the interrogatories about Diphtheria, 56 deny its presence during the past year in the towns which they represent. But its endemic character in the State is shown by the fact that the other correspondents admit that it has occurred during the year in 89 towns of the State, and in the larger cities it is reported to have been present in almost every month of the year.

The answers relating to its etiology throw no new light upon the subject, but they rather indicate that infection is the chief

mode of spreading, and that the chief reliance as means of restricting it, are isolation and disinfection.

Malarial Diseases.

The reports in regard to the prevalence of malarial diseases indicate a slow but progressive disappearance of these maladies from the State.

This is specially true of Hartford County. Nineteen towns in that county report a less prevalence than in the year before. Three say there were no cases and three that there was about the same number as in the previous year.

In New Haven County 3 towns report an increase, 4 towns a less amount, 1 town no cases, and 11 towns no change.

In New London County 1 town reports an increase, 5 towns less, and 7 towns no change.

In Fairfield County 5 towns report more, 9 towns less, 1 town none, and 5 towns no change.

In Windham County 2 towns report more, 9 less, 2 none, and 1 about the same.

Litchfield County, 4 towns report more, 7 less, 4 none, and 5 no change.

Middlesex County reports 2 towns more, 7 less, and 6 no change.

Tolland County reports 1 town more, 7 less, 4 none, and 2 about the same.

In the whole State of 140 correspondents, 18 towns report an increase, 67 a less amount, 15 towns no cases, and 40 towns as about the same as the previous year.

Taking as the most reliable sources of information, the mortality reports as rendered monthly from the Registrars of towns, and the reports of our sanitary correspondents in regard to the prevalence of sickness in the State, and it will appear that the year of our Lord 1890 was not a year of average health to the people of this Commonwealth.

The excess of sickness and death is very generally ascribed to the direct and indirect influence exerted upon life, by the epidemic "Influenza," which was everywhere present in the State at the very beginning of the year.

Although the potent impression made by this disease was so generally recognized, yet considering its almost universal prevalence very few fatal results were directly attributed to it. In

the whole State during the year the whole number certified from this cause was only 69 as given in the monthly reports of Registrars. The excess of mortality during the year was largely due to the increased number of deaths from pulmonary diseases, particularly Pneumonia and Bronchitis. There was also an unusual fatality from diseases affecting the nervous and circulatory systems.

Disposal of Sewage.

On this topic 126 replies were received representing as many towns. Of these 102 assert that the disposal of sewage is either upon the surface of the ground or the worse way, by storage in cesspools and privy vaults, in either way as usually practiced inevitably causing increasing contamination of the soil, which will become more or less dangerous to the health of families according to proximity of such pollutions to the house.

The surface disposal is unquestionably the safest, and where the amount of sewage is small, and adequate care is taken to spread it about over considerable land, is among the best methods of disposal available.

In several towns a partial system of sewers is reported for the use of citizens on one or more streets. These are often the result of private enterprise for personal advantage. Eleven towns report the discharge of sewage into streams or into Long Island Sound. And three towns are stated to employ all their sewage as manure on their lands.

The reports frequently indicate a growing appreciation of the necessity of providing better methods than have hitherto prevailed in caring for the waste materials incident to permanent occupancy of land and thickly settled places.

Most towns in the State report their water supply as good. An increasing number of towns are providing for a public supply through stored water in reservoirs.

OFFICERS OF THE LOCAL BOARDS OF HEALTH IN THE TOWNS, CITIES AND BOROUGHS OF CONNECTICUT.

[Arranged in alphabetical order irrespective of counties.]

The officers of the Town Boards of Health herein named were elected in October, 1890, to hold office one year.

The health officers of the cities and boroughs are elected in accordance with their respective charters.

Andover.

President—Wm. A. Brown.
Health Officer—Chas. L. Backus.
Clerk—F. A. Sackett.

Ansonia.

President—J. C. Platt.
Health Committee—J. B. Gardner, S. R. Baker, M.D., J. A. Fisk.
Clerk—R. H. Tucker.

Ashford.

President—Wm. Richardson.
Health Officer—Alfred Walker.
Clerk—Dwight Lincoln.

Avon.

President—E. F. Miller.
Health Officer—R. W. E. Alcott, M.D.

Barkhamsted.

President—Wallace Case.
Health Officer—H. D. Moore, M.D.
Clerk—W. F. Beach.

Beacon Falls.

President—H. C. Baldwin.
Health Officer—O. D. Buckingham.
Clerk—G. T. Clark.

Berlin.

President—N. F. Taylor.
Health Officer—R. E. Ensign, M.D.
Clerk—R. E. Ensign, M.D.

Bethany.

President—Ernest Hotchkiss.
Health Officer—S. G. Davidson.
Clerk—S. G. Davidson.

Bethel.

President—A. S. Judd.
Health Committee—H. C. Judd, A. E. Barber, M.D., G. M. Cole.
Clerk—F. E. Benedict.

Borough of Bethel.

Warden and Burgesses.

Bethlehem.

President—N. H. Bloss.
Health Committee—F. Stoughton, H. C. Hill, J. Wootten.
Clerk—G. W. Percy.

Bloomfield.

President—W. J. Gabb.
Health Officer—H. Gray, M.D.
Clerk—H. Gray, M.D.

Bolton.

President—A. H. Long.
Health Officer—N. S. Maine.
Clerk—N. S. Maine.

Bozrah.

President—Simeon Abel.
Health Officer—S. G. Johnson, M.D.
Clerk—Simeon Abel.

Branford.

President—Michael Riel.
Health Committee—W. H. Zink, M.D., C. W. Gaylord, M.D.
Clerk—W. H. Zink, M.D.

Bridgeport—City and Town.

President—C. E. Sanford, M.D.
Health Officer—R. Fitz Gibbon.
Clerk—F. C. Mullins.

Bridgewater.

President—A. H. Gillett.
Health Officer—A. B. Mallett.
Clerk—Amos Northrop.

Bristol.

President—Wm. Linstead.
Health Committee—G. S. Hull, M.D., Jno. Winslow, Jr., S. D. Bull.
Clerk—J. J. Jennings.

Brookfield.

President—Benj. Griffin.
Health Committee—J. F. Smith, M.D., D. N. Camp, W. F. Wildman.
Clerk—E. H. Northrop.

BROOKLYN.

President—J. B. Stetson.
Health Committee—C. E. Crandall, W. R. Thurber, E. M. Marlor.
Clerk—J. M. Coburn, M.D.

BURLINGTON.

President—C. B. Hotchkiss.
Health Committee—D. E. Peck, M. Lyons, Wm. Elton, M.D.
Clerk—J. A. Reeve.

CANAAN.

President—Dwight Brinton.
Health Committee—J. H. Hakes, S. W. Morris, W. Kellogg.
Clerk—W. J. Lord.

CANTERBURY.

President—W. H. Johnson.
Health Officer—L. D. Bennett.
Clerk—M. H. Sanger.

CANTON.

President—G. P. Edwards.
Health Committee—G. F. Lewis, M.D., L. Chapman, B. C. Higby, B. F. Case.
Clerk—W. W. Bidwell.

CHAPLIN.

President—J. W. Griggs.
Health Officer—O. Witter, M.D.
Clerk—F. C. Lummis.

CHATHAM.

President—J. S. Markham.
Health Officer—F. H. Dunham.
Clerk—Leonard Willey.

CHESHIRE.

President—H. H. Fields.
Health Committee—C. S. Spaulding, E. T. Cornwall, M.D., M. N. Chamberlin, M.D.
Clerk—M. N. Chamberlin, M.D.

CHESTER.

President—S. A. Wright.
Health Committee—F. Sumner Smith, M.D., J. T. Smith, L. R. Bishop.
Clerk—J. T. Smith.

CLINTON.

President—E. W. Wellman.
Health Officer—H. S. Reynolds, M.D.
Clerk—M. B. Johnson.

COLCHESTER.

President—C. C. Palmer.
Health Officer—M. W. Robinson.
Clerk—R. R. Carrington.

COLEBROOK.

President—J. A. Deming.
Health Committee—J. A. Deming, S. A. Cooper.
Clerk—S. A. Cooper.

COLUMBIA.

President—D. W. Waller, M.D.
Health Officer—D. W. Waller, M.D.
Clerk—J. N. Clarke.

CORNWALL.

President—D. L. Smith.
Health Committee—D. L. Smith, L. J. Nickerson, Theodore Kellogg.
Clerk—L. J. Nickerson.

COVENTRY.

President—E. P. Flint, M.D.
Health Committee—H. S. Dean, M.D., W. P. Haven, M.D., E. P. Flint, M.D.
Clerk—J. B. Carman.

CROMWELL.

President—Marvin Warner.
Health Officer—J. Francis Calef, M.D.
Clerk—S. V. Hubbard.

CITY OF DANBURY,

Committee of Common Council.

BOROUGH OF DANIELSONVILLE.

Warden and Burgesses.

DARIEN.

President—Ira Scofield.
Health Committee—Samuel Sands, M.D., B. W. Munson, M.D., W. F. French, M.D.
Clerk—W. F. French, M.D.

DERBY.

President—C. S. Chaffee.
Health Committee—M. E. Treat, J. Dockery, G. L. Beardsley, M.D., L. L. Loomis.
Clerk—A. J. Ewen.

DURHAM.

President—John Marshall.
Health Officer—G. W. Newton.
Clerk—C. C. Atwell.

Eastford.

President—
Health Officer—E. K. Robbins, M.D.
Clerk—J. M. Keith.

Easton.

President—E. Gould.
Health Officer—C. C. Sherman.
Clerk—C. F. Silliman.

East Granby.

President—Wm. A. Veits.
Health Officer—Wm. A. Foster.
Clerk—A. C. Bates.

East Haddam.

President—A. A. Purple.
Health Committee—J. Alexander, M. W. Plumstead, M.D., E. A. Emmons, O. H. Barker, G. H. Rose.
Clerk—C. H. Rich.

East Hartford.

President—A. Gilman.
Health Officer—E. J. McKnight, M.D.
Clerk—E. O. Goodwin.

East Haven.

President—S. W. F. Andrews.
Health Committee—L. B. Smith, J. S. Tyler, R. S. Thompson, H. Woods, D. W. Tuttle, C. C. Kirkham, C. T. Hemingway, S. W. F. Andrews, G. J. Tuttle.
Clerk—G. J. Tuttle.
Inspectors—S. W. F. Andrews, H. Woods.

East Lyme.

President—C. S. Davis.
Health Officer—F. H. Dart, M.D.
Clerk—Daniel Calkins.

East Windsor.

President—W. J. Ladd.
Health Committee—J. F. Mann, W. J. Ladd, G. A. Ellis, C. T. Inslee, S. D. Rockwell, H. O. Allen, M.D.
Clerk—H. O. Allen, M.D.

Ellington.

President—H. M. Niles.
Health Officer—R. J. Leonard.
Clerk—E. B. Kibbe.

Enfield.

President—L. H. Pease.
Health Officer—C. F. Morrison.
Clerk—F. E. Ely.

Essex.

President—G. W. Swan.
Health Officer—C. H. Hubbard, M.D.
Clerk—J. L. Phelps.

Fairfield.

President—B. B. Brothwell.
Health Committee—M. V. B. Dunham, M.D., W. H. Donaldson, M.D., C. H. Osborn, M.D.
Clerk—F. L. Sherwood.

Farmington.

President—E. Gay.
Health Committee—A. R. Wadsworth, N. O. Keys, E. C. King, M.D., G. E. Taft.
Clerk—T. L. Porter.

Franklin.

President—E. E. Ayer.
Health Officer—P. O. Smith.
Clerk—S. G. Hartshorn.

Glastonbury.

President—T. H. L. Talcott.
Health Officer—H. C. Bunce, M.D.
Clerk—W. S. Goslee.

Goshen.

President—Lyman Hall.
Health Officer—Jos. Howard North, M.D.
Clerk—Jos. Howard North, M.D.

Granby.

President—M. C. Hayes.
Health Officer—W. A. Stratton, M.D.
Clerk—W. A. Stratton, M.D.

Greenwich.

President—W. L. Griswold, M.D.
Health Officer—Spencer Franklin, M.D.
Clerk—A. M. Brush.

Borough of Greenwich.

Warden and Burgesses.

Griswold.

President—Wm. Soule, M.D.
Health Committee—G. H. Jennings, M.D., Wm. Soule, M.D., W. P. Young, S. H. Holmes, M.D.
Clerk—G. H. Jennings, M.D.

Groton.

President—Horace Clift.
Health Committee—L. M. Guernsey, J. A. Morgan, J. L. Weaver.
Clerk—N. S. Fish.

Guilford.

President—Chas. Griswold.
Health Committee—G. H. Beebe, M.D., E. W. Bartlett, R. M. Leete.
Clerk—C. H. Post.

Haddam.

President—E. P. Arnold.
Health Officer—LeRoy A. Smith, M.D.
Clerk—LeRoy A. Smith, M.D.

Hamden.

President—J. T. Henry.
Health Officer—E. D. Swift, M.D.
Clerk—E. B. Cooper.

Hampton.

Health Officer—H. H. Convers, M.D., appointed by State Board.

Hartford—City and Town.

President—James Campbell, M.D.
Clerk—W. W. Knight, M.D.
Inspector—P. J. Darcy.

Hartland.

President—Irwin Emmons.
Health Officer—J. G. Miller.
Clerk—J. A. Miller.

Harwinton.

President—J. M. Baldwin.
Health Committee—Willis Catlin, C. S. Birge, J. S. Pratt.
Clerk—N. A. Wilson.

Hebron.

President—C. H. Pendleton, M.D.
Health Committee—C. H. Pendleton, M.D., H. F. Porter, F. R. Post.
Clerk—F. C. Bissell.

Huntington.

President—S. T. Palmer.
Health Committee—G. A. Shelton, M. D., J. Tomlinson, G. M. Wakelee, E. S. Hawley, S. B. Brownson.
Clerk—J. Tomlinson.

Kent.

President—Luther Eaton.
Health Officer—B. G. Pratt.
Clerk—J. F. Gibbs.

Killingly.

President—E. A. Hill, M.D.
Health Committee—E. A. Hill, M.D., W. H. Judson, M.D., H. L. Hammond, M.D.
Clerk—E. L. Palmer.

Killingworth.

President—W. E. Griswold.
Health Officer—A. B. Stevens.
Clerk—N. H. Evarts.

Lebanon.

President—W. G. Kingsley.
Health Officer—W. P. Barber, M.D.
Clerk—N. C. Barker.

Ledyard.

President—N. M. Gallup.
Health Officer—I. G. Geer.
Clerk—C. A. Gray.

Lisbon.

President—A. F. Read.
Health Officer—J. G. Bromley.
Clerk—J. G. Bromley.

Litchfield.

President—Wm. Deming, M.D.
Health Committee—J. T. Sedgwick, M.D., C. O. Belden, M.D., C. L. Blake, M.D., J. L. Buell, M.D., H. W. Buell, M.D., F. H. Wiggin, M.D., J. T. Hubbard.
Clerk—C. O. Belden, M.D.

Borough of Litchfield.

The Warden and Burgesses.

Lyme.

President—Frederick Fosdick.
Health Officer—J. G. Ely, M.D.
Clerk—J. H. Lord.

MADISON.

President—J. H. Meigs.
Health Committee—J. N. Chittenden, J. M. Hill, M. A. Wilcox.
Clerk—H. B. Wilcox.

MANCHESTER.

President—Geo. H. Hall.
Health Committee—C. W. Jacques, M.D., Geo. H. Hall, F. H. Whitter, M.D., B. F. T. Jenney, T. H. Weldon, M.D.
Clerk—B. F. T. Jenney.

MANSFIELD.

President—E. G. Sumner, M.D.
Health Committee—E. G. Sumner, M.D., G. W. More.
Clerk—G. W. More.

MARLBOROUGH.

President—A. B. Latham.
Health Committee—Chas. Buell, A. B. Latham.
Clerk—John Lord.

CITY OF MERIDEN.

Health Committee—J. H. Chapin, J. T. Kane, H. A. Curtis, Wm. Collins, R. L. Brewer, E. Scheurer.

MERIDEN.

President—LeGrand Bevins.
Health Committee—O. J. D. Hughes, M.D., A. W. Tracy, M.D., LeG. Bevins.
Clerk—L. J. Gaines.

MIDDLEBURY.

President—J. T. Basham.
Health Officer—Marcus DeForest, M.D.
Clerk—Marcus DeForest, M.D.

MIDDLEFIELD.

President—J. T. Inglis.
Health Committee—M. W. Terrill, V. H. Coles, D. Fowler.
Clerk—C. N. Burnhan.

CITY OF MIDDLETOWN.

The Common Council.

MIDDLETOWN.

President—D. J. Donahoe.
Health Committee—S. M. Bacon, R. Davis, M. H. Johnson, M. Loveland, I. L. Gardner, D. J. Donahoe, W. U. Pearne.
Clerk—R. S. Hayes.

MILFORD.

President—I. C. Smith.
Health Committee—Jas. McCarthy, P. S. Bristol, E. B. Heady, M.D., W. S. Putney, M.D.
Clerk—P. S. Bristol.

MONROE.

President—A. L. Burr.
Health Committee—Burr Hawley, A. L. Burr, W. R. Ferris, J. G. Stevens, M.D.
Clerk—Burr Hawley.

MONTVILLE.

President—N. S. Comstock.
Health Officer—Earl Mathewson, M.D.
Clerk—J. R. Gay.

MORRIS.

President—R. H. Harrison.
Health Committee—R. H. Harrison, Homer Stoddard, J. M. Benton.
Clerk—J. M. Benton.

NAUGATUCK.

President—W. F. Hinckley, M.D.
Health Committee—E. B. Goodyear, Jno. Degan, M. P. Coen, N. S. Andrews, N. Wilmot.
Clerk—M. H. Lawlaus.

CITY OF NEW BRITAIN.

Health Committee—L. M. Cremin, M.D., Leopold Klett, W. L. Morgan, H. G. Parsons, H. P. Strong.

NEW BRITAIN TOWN.

President—Samuel Bassett.
Health Officer—L. M. Cremin, M.D.
Clerk—Albert Morton.

NEW CANAAN.

President—F. M. Bliss.
Health Officer—C. B. Keeler, M.D.
Clerk—J. F. Silliman.

NEW FAIRFIELD.

President—I. S. Knapp.
Health Committee—E. Tredwell, I. S. Knapp, H. H. Wildman.
Clerk—H. H. Wildman.

NEW HARTFORD.

President—H. R. Jones.
Health Committee—J. Burwell, M.D., E. D. Curtis, M.D., G. S. Wright, M.D., G. W. Bancroft.
Clerk—F. A. Jewell.

Newington.

President—J. H. Fish.
Health Officer—L. V. Durand, M.D.
Clerk—H. L. Kellogg, Jr.

New London City.

Health Committee—Geo. C. Strong, E. N. Crocker, H. J. Savage.

New Haven.

President—A. E. Winchell, M.D.
Health Officer—F. W. Wright, M.D.
Clerk—Ward Bailey.
Sanitary Inspectors—J. C. Jackson, Lewis Mix, Martin Conlan.

New Milford.

President—I. B. Bristol.
Health Committee—J. C. Barker, M.D., J. D. Clark, J. W. McMahon.
Clerk—Alex. Levy.

Newtown.

President—C. W. Dayton,
Health Officer—D. P. Richardson, M.D.
Clerk—M. J. Cavanaugh.

Norfolk.

President—M. F. Grant.
Health Officer—J. C. Kendall, M.D.
Clerk—R. J. Crissey.

North Branford.

President—H. O. Page.
Health Committee—M. C. Bishop, Edw. Smith.
Clerk—Edw. Smith.

North Canaan.

President—W. J. Ferguson.
Health Officer—J. H. Drake.
Clerk—A. B. Garfield.

North Haven.

President—Whitney Elliott.
Health Officer—R. B. Goodyear, M.D.
Clerk—L. P. Tuttle.

North Stonington.

President—C. H. Main.
Health Officer—E. H. Knowles, M.D.
Clerk—N. A. Brown.

NORWALK.

President—Sam'l Daskam.
Health Committee—Sam'l Daskam, Russell Frost, F. M. Baker, M.D., J. G. Gregory, M.D., C. B. Coolidge.
Clerk—C. B. Coolidge.

NORWICH.

Health Committee—P. Cassidy, M.D., L. S. Paddock, M.D., Wm. Witter, M.D., H. M. Bishop, M.D., F. A. Tillinghast, M.D., J. Eccles, J. S. Lathrop, W. T. Case.
Clerk—L. S. Paddock, M.D.

CITY OF NORWICH.

The Court of Common Council.

OLD LYME.

President—J. G. Perkins.
Health Officer—G. W. Harris, M.D.
Clerk—J. L. Terry, M.D.

OLD SAYBROOK.

President—J. N. Clark.
Health Officer—J. H. Granniss, M.D.
Clerk—G. E. Spencer.

ORANGE.

President—D. S. Thompson.
Health Officer—J. F. Barnett, M.D.
Clerk—W. A. Main.

OXFORD.

President—J. H. Bartlett.
Health Officer—Lewis Barnes, M.D.
Clerk—E. B. Treat.

PLAINFIELD.

President—Gurdon Cady.
Health Officer—Frank Miller.
Clerk—Wm. I. Hyde.

PLAINVILLE.

President—C. S. Hough.
Health Officer—J. N. Bull, M.D.
Clerk—J. N. Bull, M.D.

PLYMOUTH.

President—E. M. Talmadge.
Health Committee—E. M. Talmadge, A. Bunnell, A. M. Johnson, W. P. Swett, M.D., J. C. Fenn.
Clerk—J. C. Fenn.

POMFRET.

President—A. B. Smith.
Health Committee—F. G. Sawtelle, M.D., Seth Rogers, M.D., A. S. Bruce, H. Sabin, T. O. Elliott.
Clerk—George Allen.

PORTLAND.

President—James Pelton.
Health Committee—J. Pelton, G. B. Cleveland, C. A. Sears, M.D., R. M. Griswold, M.D.
Clerk—C. A. Sears, M.D.

PRESTON.

President—Aaron Lucas.
Health Committee—Aaron Lucas, Hugh King, G. C. Clarke, M.D.
Clerk—Hugh King.

PROSPECT.

President—D. B. Hotchkiss.
Health Officer—J. R. Platt.
Clerk—D. M. Plumb.

PUTNAM.

President—C. D. Torrey.
Health Committee—C. H. Chesebro, A. H. Corbin.
Clerk—O. Coman.

REDDING.

Health Officer—R. W. Lowe, M.D. Appointed by State Board.

RIDGEFIELD.

President—E. W. Keeler.
Health Committee—W. S. Todd, M.D., H. Smith, D. S. Sholes.
Clerk—H. K. Scott.

ROCKY HILL.

President—W. G. Robbins.
Health Committee—J. E. Whalen, J. S. Stevens, J. W. Camp, Jr.
Clerk—F. L. Burr, M.D.

ROXBURY.

President—B. S. Preston.
Health Officer—L. J. Pons, M.D.
Clerk—H. S. Hurlburt.

CITY OF ROCKVILLE

Common Council.

SALEM.

President—H. E. Avery.
Health Officer—C. F. Congdon, M.D.
Clerk—C. F. Congdon, M.D.

SALISBURY.

President—A. J. Spurr.
Health Committee—A. J. Spurr, P. Turner, Wm. Bissell, M.D.
Clerk—P. Turner.

SAYBROOK.

President—J. W. Marvin.
Health Officer—E. Bidwell, M.D.
Clerk—J. B. Banning.

SCOTLAND.

President—O. S. Remington.
Health Officer—E. D. Kimball, M.D.
Clerk—C. M. Smith.

SEYMOUR.

President—A. Storrs.
Health Officer—R. E. Warner, M.D.
Clerk—C. J. Atwater.

SHARON.

President—W. W. Knight, M.D.
Health Committee—W. W. Knight, M.D., M. F. Whitney, E. H. Bartram.
Clerk—W. Baker.

BOROUGH OF SHELTON.

Warden and Burgesses.

SHERMAN.

President—W. B. Pepper.
Health Committee—J. N. Woodruff, M.D., H. T. Haviland, H. A. Wheeler.
Clerk—C. A. Mallory.

SIMSBURY.

Health Officer—C. M. Wooster, M.D. Appointed by the State Board.

SOMERS.

President—K. V. Chapin.
Health Committee—W. B. Woods, M.D., Wm. McMullen, Jr., A. D. Noble.
Clerk—Charles S. Fuller.

SOUTHBURY.

President—T. F. Wheeler.
Health Officer—M. L. Cooley, M.D.
Clerk—C. S. Brown.

SOUTHINGTON.

President—W. S. Plumb.
Health Officer—J. H. Osborne, M.D.
Clerk—J. H. Osborne, M.D.

City of South Norwalk.

Board of Councilmen.

South Windsor.

Health Officer—T. S. Hodge, M.D. Appointed by the State Board.

Sprague.

President—T. H. Allen.
Health Committee—T. I. Stanton, M.D., E. Allen, B. S. Gallup.
Clerk—W. D. Nolan.

Stafford.

President—G. F. Phillips.
Health Officer—C. B. Newton, M.D.
Clerk—A. J. Turner.

Borough of Stafford Springs.

Warden and Burgesses.

Stamford.

President—Wm. R. Lockwood.
Health Officer—F. J. Rogers, M.D.
Clerk—Benj. U. Lyon.

Borough of Stamford.

Warden and Burgesses.

Sterling.

President—A. A. Stanton.
Health Officer—C. N. Allen, M.D.
Clerk—W. C. Pike.

Stonington.

President—G. W. Tingley.
Health Committee—G. D. Stanton, M.D., F. A. Coates, M.D., W. H. Gray, M.D., G. W. Tingley, J. W. Chesebro, J. J. Purtell, A. H. Hinckley.
Clerk—G. D. Stanton, M.D.

Borough of Stonington.

Warden and Burgesses.

Stratford.

President—S. C. Lewis.
Health Committee—R. W. Curtis, C. C. Peck, S. Judson, Jr., F. Lewis, M.D.
Clerk—S. Judson, Jr.

Suffield.

President—E. Halladay.
Health Officer—J. K. Mason, M.D.
Clerk—Samuel White.

THOMASTON.

President—A. P. Bradstreet.

Health Committee—B. W. Pease, M.D., C. F. Smith, M.D., H. H. Hotchkiss.

Clerk—F. W. Etheridge.

THOMPSON.

President—L. Holbrook, M.D.

Health Committee—L. Holbrook, M.D., O. Tourtellotte, L. P. Lamoureux, J. Cruff, W. A. Burgess.

Clerk—O. Tourtellotte.

TOLLAND.

President—E. S. Agard.

Health Officer—W. N. Simmons, M.D.

Clerk—F. T. Newcomb.

TORRINGTON.

President—C. M. Johnson.

Health Committee—H. J. Pulver, M.D., W. L. Platt, M.D., T. S. Hanchot, M.D.

Clerk—W. A. Roraback.

TRUMBULL.

President—O. S. Mallett.

Health Committee—Seth Hill, M.D., F. C. Starkweather, M.D., S. G. Beardsley.

Clerk—S. G. Beardsley.

UNION.

President—L. A. Corbin.

Health Committee—H. B. Booth, G. Willis.

Clerk—W. G. Howard.

VERNON.

President—O. C. West.

Health Committee—E. K. Leonard, M.D., A. R. Goodrich, M.D., T. F. Rockwell, M.D.

Clerk—F. B. Skinner.

VOLUNTOWN.

President—I. C. Main.

Health Committee—I. C. Main, W. R. Davis, M.D.

Clerk—J. K. Bitgood.

WALLINGFORD.

President—W. J. Morse.

Health Committee—J. D. McGaughey, M.D., W. S. Russell, M.D., Henry Davis, M.D.

Clerk—Z. P. Beach.

BOROUGH OF WALLINGFORD.

Court of Burgesses.

WARREN.

President—B. E. Carter.
Health Committee—F. P. Johnson, J. B. Derrickson, M.D.
Clerk—J. B. Derrickson, M.D.

WASHINGTON.

President—J. G. Fenn.
Health Committee—O. Brown, M.D., W. J. Ford, M.D., R. A. Marcy, M.D.
Clerk—G. C. Ford.

CITY OF WATERBURY.

President—C. R. Baldwin.
Health Officer—C. W. S. Frost, M.D.
Clerk—E. G. Kilduff.

TOWN OF WATERBURY.

President—F. J. Brown.
Health Officer—B. A. O'Hara, M.D.
Clerk—J. J. Madden.

WATERFORD.

President—J. L. Payne.
Health Officer—G. M. Minor, M.D.
Clerk—C. H. Peabody.

WATERTOWN.

President—H. W. Warner.
Health Officer—W. G. French.
Clerk—H. T. Dayton.

WESTBROOK.

President—R. H. Stannard.
Health Officer—T. B. Bloomfield, M.D.
Clerk—C. H. Chapman.

WEST HARTFORD.

President—E. T. Stanley.
Health Officer—F. H. Stadtmuller.
Clerk—M. E. Goodwin.

WESTON.

President—M. V. B. Rowland.
Health Officer—F. Gorham, M.D.
Clerk—D. S. Parsons.

WESTPORT.

President—S. B. Sherwood.
Health Committee—S. B. Sherwood, Rufus Wakeman, L. T. Day, M.D.
Clerk—L. T. Day, M.D.

Wethersfield.

President—W. W. Adams.
Health Officer—E. G. Fox, M.D.
Clerk—G. H. Chaffee.

Borough of Willimantic.

Warden and Burgesses.

Willington.

President—A. Korper.
Health Officer—W. L. Higgins, M.D.
Clerk—J. A. Potter.

Wilton.

President—N. M. Belden.
Health Officer—A. B. Gorham, M.D.
Clerk—H. E. Chichester.

Winchester.

President—Edw. Finn.
Health Committee—W. S. Hulbert, M.D., E. H. Welch, M.D., G. W. Brown, M.D.
Clerk—W. Persons.

Windham.

President—J. W. Webb.
Health Committee—C. H. Colegrove, M.D.
Clerk—T. J. Kelly.

Windsor.

President—J. E. Higinbotham.
Health Committee—C. E. Phelps, J. N. Dickson, M.D., N. S. Bell, M.D.
Clerk—N. S. Bell, M.D.

Windsor Locks.

President—S. B. Douglass.
Health Officer—T. F. McCarty.
Clerk—J. P. Healy.

Wolcott.

President—H. B. Carter.
Health Officer—J. H. Garrigus.
Clerk—J. R. S. Todd.

WOODBURY.

President—H. H. Minor.
Health Officer—H. W. Shove, M.D.
Clerk—A. D. Warner.

WOODBRIDGE.

President—T. R. Baldwin.
Health Officer—J. W. Barker, M.D.
Clerk—J. W. Barker, M.D.

WOODSTOCK.

President—H. N. Safford.
Health Committee—G. A. Bowen, M.D., H. W. Hibbard, H. N. Safford, H. R. Lowe, M.D., F. A. Hanson, M.D., E. Bishop.
Clerk—N. E. Morse.

ABSTRACTS FROM THE REPORT OF SOME OF THE LOCAL BOARDS OF HEALTH.

AVON—*R. W. E. Alcott, M.D., Health Officer*, Reporter.

The Board of Health of this town had no meeting after the annual election of officers, and I was only required to act in one or two cases.

BARKHAMSTED—*W. F. Beach, Clerk*, Reporter.

No complaint in regard to the sanitary condition of the town has been made to the Board, nor has there seemed to be need of action on their part.

BERLIN—*R. E. Ensign, Health Officer*, Reporter.

There has been no meeting of our Board of Health save only to organize and to take measures to protect the town from the invasion of small-pox which prevailed so extensively in the neighboring city of Meriden the past year. There was only one complaint about a nuisance arising from a sink drain, which the Health Officer visited and caused to be corrected. There were a few cases of diphtheria which in one family was, presumably, traced to a choked cellar drain, and upon being instructed by the Health Officer to open and disinfect it, the disease was arrested. Certain signs indicate that Boards of Health are gaining in the estimation of the people, as information is more freely diffused relative to the preservation of that inestimable blessing of health.

BETHANY—*S. G. Davidson, Clerk*, Reporter.

There have been no cases which needed any action of the Board, or no cases came to our knowledge, during the past year.

BETHEL—*A. E. Barber, M.D., Health Officer*, Reporter.

We have done whatever work has come to our notice, but not much has presented itself. The sanitary condition of our borough is quite good and it is our aim to continue it thus.

BLOOMFIELD—*Henry Gray, M.D., Health Officer*, Reporter.

Our Board of Health, previous to their appointment, had not given much attention to the subject which they would be called to act upon, but they are intelligent business men, and if there should be any occasion they could be depended on to enforce the rules of the State Board in reference to contagious diseases or any other subjects on which rules have been given by the Board.

I have often examined places in reference to sanitary conditions, and although a few are faulty, the town is very healthy, which, of course, speaks well for the efficiency of the Town Board.

BOLTON—*N. S. Maine, Health Officer*, Reporter.

We are a small town located on the high hills. We have had no occasion to act as a Board of Health—that is to say, we have had no case of small-pox, scarlet fever, measles or mumps within the year, and have not been called up as a Board of Health to act upon any occasion and have held no meetings within the year only to organize.

BRANFORD—*C. W. Gaylord, M.D., Health Officer*, Reporter.

Board was organized in accordance with law and the usual officers, including a Health Committee of two, elected, to whom, in matters pertaining to the health of the town, the powers of the Board were in the main delegated. The duties of this Committee have not been over-burdensome this year. Various minor nuisances have been abated, and one matter of very general importance to the health of the community has been undertaken, viz., the drainage of two quite extensive areas near the center of our village, the *natural* drainage of which, never very good, has been at various times and in various ways obstructed.

CANAAN—*Walter Kellogg, Health Officer*, Reporter.

Do not know of anything the Town Board have done except compel one family to stay at home while the children had the diphtheria.

CANTERBURY—*Luman D. Bennett, Health Officer.*

There has been no epidemic nor anything to occasion any action on the part of the Board ; there will consequently be no further report.

CHAPLIN—*Orin Witter, M. D.*, Reporter.

No complaints have been made to the health officer during the year ending Nov. 30, 1890. There has been but one case of typhoid fever in town and that one was caused, I think, by drinking impure well water. The well was cleaned out and there has been no more typhoid fever.

CHATHAM—*F. H. Dunham, President*, Reporter.

No serious diseases of an epidemic or contagious character have prevailed in the town during the past year to such an extent as to demand action by the Board, and we are happy to represent that the general health of the town is of a satisfactory character.

CHESHIRE—*M. N. Chamberlain, M.D., Clerk*, Reporter.

During the Fall the importance of vaccination was a subject of discussion by the Board. As there were many unvaccinated children in the town, it seemed best to bring the matter before the public at the January town meeting. Accordingly, at this meeting, the President ably and forcibly urged the duty of vaccination upon the citizens. The Board of Education was requested to coöperate in obtaining the number of unvaccinated children and young persons in the town. They kindly consented to do so, and from their report it appeared that the number of unvaccinated children and young persons on January 1st, 1890, was about one hundred and fifty (150).

Since that date probably more than half have been vaccinated and it is hoped that parents and guardians, during the coming season, will give this important duty the attention it deserves.

Owing to the prevalence of small-pox in the neighboring town of Meriden, the subject was again brought before the public in March last by a circular letter sent to the committee of each school district.

During the present year there has been somewhat more sickness than in the year preceding. In the winter there were many cases of the so-called "Influenza" or "La Grippe." The monthly bulletins of the State Board have been put up in the center post office as usual.

CHESTER—*J. Tyler Smith, Clerk,* Reporter.

The Board of Health has had but little work the past year. No disease has been reported to the Board by any physician during the year. One place was reported filthy and was ordered cleaned. Dead animals have been left exposed, but a notice to the owners from the Board has been sufficient to have them removed. The Board is organized and willing to do its duty just as far as the town will support them, but we cannot work on rumor. I heard last summer of one case of scarlet fever, made inquiries about it, and found all precaution was used to prevent it spreading, but the doctor made no report. There has been several cases of typhoid fever, but as the doctors say nothing to the Board there seems to be nothing for us to do. The drinking water is considered good in the town, and as a general thing the homes are clean and surroundings good. La Grippe was the indirect cause of some deaths, otherwise the health of the town has been as good as usual. Have tried to interest the people in a quiet way about vaccination, but the interest is not as general as I could wish.

COLEBROOK—*P. Bowman, Clerk,* Reporter.

In the Fall and fore part of Winter the town enjoyed good health, excepting some diphtheria at Colebrook river. From about the 1st of January, 1890, until in March, La Grippe raged quite severely, and its effects have scarcely passed away yet, leaving a number with coughs and throat troubles. In June there was a special meeting of the Board at Colebrook River to investigate some premises situated there that were represented by good citizens there to be very filthy. We found them about as represented, and ordered an immediate cleaning out, which was promptly attended to and the diphtheria of which there had been a few cases in the spring, has disappeared, and the village seems as healthy as any other part of the town at present. We have had one case of measles and that is all; by prompt attention it did not spread. Take it all together the past year we have cause for gratitude, as we have not been afflicted with any severe attacks of diseases, and the people of our town have enjoyed usual good health.

COLCHESTER—*M. W. Robinson, Health Officer, M. D.*, Reporter.

The past year has been without epidemics except two cases of scarlatina in one of our mill boarding-houses, both of which cases were isolated and by proper disinfection and fumigation after convalescence, there was no spread of the disease. The disease was brought by a boarder from New York State. Aside from this and attention called to drainage of cesspool at hotel (which was remedied) and one or two private residences there is nothing to report.

CORNWALL—*L. J. Nickerson, Clerk*, Reporter.

The only case for action during the year was from the presence of a pig sty at Cornwall Bridge, in the town, which it was found would endanger the health of the community. Prompt action was taken by the Town Board of Health and the danger and nuisance was abated and removed. The unusual healthy condition of the town has called for no other action on the part of the Board. The town has not been visited during the year by any contagious disease. The Board has experienced no difficulty in enforcing the law.

DARIEN—*Samuel Sands, M.D., B. W. Munson, M.D., William Freeman French, M.D., Health Committee*, Reporters.

Excluding an investigation of an outbreak of diphtheria the Board has had only one complaint to investigate the past year.

This investigation was asked for by a tenant who suspected the well from which the water supply was drawn to be contaminated by sewage.

On February 1st, 1890, the Health Committee visited the premises and found the situation of the well to be under the kitchen of the house and close to the foundation-wall of the house. Removing a portion of the floor, a fearful stench greeted our sense of smell, and a thick scum of greasy-looking substance was observed upon the top of the water.

The well being sounded by means of a string and a stove-lifter was found to be 26½ feet in depth, with a deep deposit of soft mud at the bottom.

The water rose within 11 feet of the ground surface.

It was claimed that a light lowered into the well previous to our visit had been extinguished by the foul gas.

There was no ventilation for the well except through the kitchen floor.

The water *was* contaminated by sewage, and every thing lowered into the water was coated with a soft, thick, vile-smelling sediment.

A large willow tree growing within eight feet of the well had sent a mass of fibrous roots into it, and with the sediment choked the pump—the means of drawing water from the well.

A cesspool built of loose stones was found within 30 feet of the well, and a tile-drain pipe which started from the sink within a foot of the well (sink and stationary wash-tubs being directly over the well) was the means of communication.

The tile-pipe was broken close to the well, and was the means of the contaminating material reaching the water; it is probable that the break has existed for years, for the history of the dwelling shows within the last twenty years its inmates have suffered from the following diseases: Diphtheria and other severe throat troubles, continued fevers, chronic dysentery—so-called—and one case of gastric disease which was called cancerous, and ended fatally.

Without further deliberation the Committee ordered the well to be filled in.

No record of the cesspool having been cleaned could be found. The present occupants have suffered from throat and diarrhœal troubles ever since residing in the house.

DERBY—*George L. Beardsley, M.D., Health Officer*, Reporter.

There have been no proceedings instituted by the Board of Health of Derby for the year ending Nov. 30th, 1890.

EAST HAVEN—*G. J. Tuttle, Clerk*, Reporter.

Nothing of sufficient moment has arisen in our town during the past year to demand official action by the Board. Our inspectors have investigated two complaints in regard to nuisances, one caused by a slaughter house and the other by an overflowing privy vault. In both cases the trouble was promptly removed by the offending parties without formal action by the Board. With these exceptions we have not been called on to act and we have, therefore, nothing of importance to report.

EAST WINDSOR—*H. O. Allen, M.D., Clerk*, Reporter.

There have been no epidemics or contagious diseases in town during the year.

Small-pox made its appearance in one family in town during the year. The disease was contracted by one member of the family in the rag room of one of the Paper Mills at Windsor Locks. From that case developed two more in the same family, of which one died. The matter as soon as discovered was taken in hand by the Health Committee of the Board and the family completely isolated from the outside world and no cases so far as known developed from these. Vaccination was insisted upon and about six hundred were vaccinated, in some instances at the expense of the town authorities.

The Board has not been called upon to abate any nuisance, which speaks volumes for the sanitary condition of the town.

EASTON—*C. C. Sherman, Health Officer*, Reporter.

The only doings of the Board of Health of this town for the year are the organization as the law directs, and the appointment of a Health Officer. There has been nothing requiring further action of the Board.

ENFIELD—*Charles F. Morrison, Health Officer*, Reporter.

During the latter part of the summer and early in the fall there were some complaints about bad sewerage ; but recently we have a system of sewerage put in and this has remedied all that trouble. There have been no complaints but such as I have promptly attended to.

ESSEX—*C. H. Hubbard, M. D., Health Officer*, Reporter.

Nothing of special importance has occurred requiring action of the Board beyond an occasional attempt in the way of "moral suasion" on some careless or delinquent property holder who had permitted a nuisance about his premises, and the publishing in the local paper of an article urging special care in respect to drainage, cesspools, water supply, etc., little has been done nor has there been manifest occasion for official action.

FARMINGTON—*E. C. King, M.D., Health Officer*, Reporter.

No official action was taken by the Town Board of Health of Farmington during the year past.

GLASTONBURY—*William S. Goslee, Clerk*, Reporter.

A special meeting of the Board was held, on legal notice given, on the 30th of October, which was quite fully attended by the members. At said meeting, after full discussion, the following rules and regulations in relation to the public health were adopted, which, with a regulation previously made by said board, were ordered to be printed and circulated and posted, to wit:

No. 1. No pile of manure shall be allowed to remain near any dwelling-house, or on or near any highway in this town, more than three days after a complaint in writing, signed by some responsible person or persons, shall have been presented to the health officer, stating that the same is a nuisance, except upon permission in writing from said health officer.

No. 2. No person shall keep or maintain upon his premises, at any time, any privy, water-closet, cesspool, sink, drain, or other like receptacle, except in a cleanly and inoffensive condition.

No. 3. No person shall throw, dump, or deposit any filth, garbage, decaying animal or vegetable matter, which may become prejudicial to public health, upon any vacant lot, highway, park, or public place. This does not preclude the proper use of fertilizers.

No. 4. No person sick or convalescent from any malignant, infectious, or contagious disease, or who lives with a family so affected, shall attend any school or public gathering in this town, except upon the presentation of a certificate from some reputable physician stating that there is no danger from such attendance.

No. 5. Every physician who shall have prescribed for or attended any person having the disease of small-pox, scarlet fever, diphtheria, typhoid fever, typhus fever, Asiatic cholera, or yellow fever, shall *forthwith*, after ascertaining the nature of the disease, report, in writing, to the health officer the name, age, and address of such person, with such other information as required by the blanks furnished for that purpose. Every attending physician shall also report, in writing, to the health officer the name, age, and address of every person who shall have died of any of said infectious diseases, giving the specific name thereof, within twelve hours after he shall have been informed of such death; this report to be *in addition* to the certificate of death required for the Town Clerk.

No. 6. There shall be no public funeral of any person who shall have died from small-pox, scarlet fever, measles, diphtheria, typhus fever, typhoid fever, Asiatic cholera, or yellow fever, without the permit of the health officer, and subject to such sanitary orders as he may prescribe.

The following regulation was passed in October, 1888 :

No privy vault, cesspool, or reservoir, into which a privy, water-closet, stable, or sink is drained, except it is water-tight, shall be established or permitted within four hundred (400) feet of a well, spring, or other source of water used for drinking purposes, without the written permission of the Board of Health, based upon the advice of the health officer or health committee. The entire contents of such privy vault, cesspool, or reservoir must be removed, when necessary, and not deposited in or on the surface of the ground within at least four hundred (400) feet of a well, spring, or other source of water used for drinking purposes, without the written permission of the Board of Health, based upon the advice of the health officer or health committee.

☞ The *willful* violation of the rules and regulations of the Board of Health is an offense against the statutes of the State, subject to certain prescribed penalties therefor.

In many respects it has been a remarkable year for the prevalence of contagious diseases. The health officer has not only done his duty in investigating the cases as they have occurred, but has also issued several orders having reference to the prevention of infectious diseases, and the safety of the public health. He has been assisted in all these matters by the resident physicians, but has reason to think that out-of-town doctors have not been as careful as they should have been in making their report. We presume it has been more the result of ignorance of the law, and of our regulations founded thereon, than of any willful neglect. The clerk by the direction of the board has, at considerable expense, prepared the proper returns to be made to the health officer, required by paragraph 5 of the foregoing rules.

The health officer reports that, during the year ending September 15, 1890, there have been reported to him as follows :

Cases of Diphtheria, ...	46
" " Croupal Diphtheria, . . .	5
" " Scarlet fever, ...	4
" " Typhoid fever, ...	1
And of Deaths by Diphtheria, . . .	5
" " " " Croupal Diphtheria, .	5
" " " " Typhoid fever, . .	1

He also expresses the opinion, that some cases of death occurred from the above-named diseases that have not been reported to him.

So far as possible he has caused regulation No. 6 to be observed, relating to public funerals of persons dying of infectious diseases.

We desire to call the attention of our sextons to the fact that they are not allowed to open graves for the burial of any persons without a permit from the Registrar of *this* town. A *removal* permit issued by the town clerk of any town does not of itself authorize the burial in this town.

By reason of a more general appreciation of the powers, use, and responsibility of the board, and especially of the health officer, there have been many more calls than ever before for the exercise of their statutory duties. They and he are public officers, and what they do must be done in the light of day. Hence, it has been considered proper not to take notice of or act upon information contained in anonymous letters or communications, but any information conveyed in a responsible method, or from a responsible source, has been promptly attended to and the complaint thoroughly investigated without fear or favor.

All of which is respectfully submitted in behalf of the Board of Health.

GRANBY—*W. A. Stratton, M.D., Health Officer*, Reporter.

What we have done for the past year has been in the line of suggesting in regard to cesspools, out-draining, and surroundings of dwellings, isolation of all contagious diseases with thorough disinfection. I think we have accomplished, with the authority of the State Board back of us, results that will benefit the people of the town.

GRISWOLD—*George H. Jennings, M.D., Clerk*, Reporter.

A special meeting of the Board was held March 3d, 1890, on account of the cases of small-pox that were in the State. The circular sent out by the State Board was read and discussed. At the request of the Board the Health Committee prepared and distributed the following notice:

NOTICE.

To the Inhabitants of Griswold:

FRIENDS—The increasing prevalence of small-pox through the center of the State is a matter that very much concerns us. Twice, during February, a person who had this disease, was permitted to travel on a a passenger train on the railroad between Meriden and New Haven;

thus making it possible for this disease to be spread throughout the State.

Are you protected by vaccination? Is your neighbor protected by vaccination?

In view of the danger, and of the fact that a large number of our people are not protected by vaccination, the Board of Health offers this protection to all. Good vaccine virus will be furnished and all persons may be vaccinated at the nominal cost of ten cents each if applying at the time and place designated. That none may be prevented from receiving this protection all who do not feel disposed to pay will be vaccinated free of charge.

A physician will be in attendance at.....

on.....

For this purpose it is hoped that all will interest themselves in this important matter that we may escape the possibility of an epidemic of this dangerous and dreaded disease.

WM. SOULE, M. D.,
GEO. H. JENNINGS, M. D., } *Health Committee.*
WM. P. YOUNG,

At as many places as convenient, a physician vaccinated all who chose to apply. The number so vaccinated was two hundred and ninety-one (291). Of this number a large per cent. was among the school children, especially in the outside districts. In several instances the teacher leading on the scholars. The mill hands were found much better protected than was supposed to be the fact.

The Health Committee also provided a suitable place where a case of small-pox might be taken to and cared for, and other necessary arrangements as to food, bedding, and a suitable nurse was arranged for.

At the annual meeting of the Board, held October 8th, the subject of drainage was brought forward, relating more especially to the two parts of the village of Jewett City, occupied by the tenants of the cotton manufactories. Owing to the Health Committee proper steps had already been taken in the lower part of the village, owned by William Slater, to thoroughly sewer the dwellings owned by him, and it is gratifying to be able to say that, by Mr. Slater's promptness and vigor, the work at the present date is nearly completed, and the work is done in a most thorough manner. Arrangements are being made whereby all slops and sink drains, as well as all surface drainage will be conveyed away from the village.

A committee was appointed to confer with the Ashland Cotton Manufacturing Company to see if they could not be induced to adopt a similar system of drainage, of which there is nearly as great need as in the other case, but so far without any success.

GROTON—*N. S. Fish, Clerk*, Reporter.

There has been no call, so far as I know, for any action on the part of the committee appointed to act in cases as by law provided. There have been no cases of malignant diseases which have become epidemic.

GOSHEN—*Jos. Howard North, M.D., Health Officer*, Reporter.

We have had no strictly official work to do, our town being entirely agricultural, and the sanitary conditions generally good, and besides this, being the only physician located in the town, by virtue of my vocation I have a very good oversight of the hygienic conditions of the community.

While I am sorry to be unable to report a more enthusiastic organization and work in our town, I am happy to state that the public health and surroundings have fortunately been such during the past year, as not to require the organized efforts of the Board of Health on any occasion.

HAMDEN—*Edwin D. Swift, M.D., Health Officer*, Reporter.

Your Committee report that from Sept. 20, A. D. 1889, until Dec. 26, the health of this town was exceptionally good; but on the last mentioned date, the epidemic, which during last fall swept over Europe with such fearful fatality, appeared among us, and continued with unabated violence until Feb. 6, A. D. 1890, during which time, it is believed, scarcely a household escaped its influence, causing more deaths among us, as well as elsewhere, than any epidemic of modern times; its subsidence left many of its victims weak and diseased, some of whom have, after weeks or months of suffering, been obliged to succumb to the fell destroyer. Cases also occasionally occurred during the spring and summer, evidently partaking of its character during the winter, though less violent. About the 20th day of August the disease reappeared, though in a greatly modified form.

Scarlet fever, in a mild form, has prevailed somewhat extensively; a few cases occurring in neighborhoods remote from each

other, originating, probably, at least in some instances, by contagion encountered in New Haven; but one fatal case has occurred so far as is known to your Committee.

Pig sties, which in the past have given much trouble, have generally been kept in a much better sanitary condition, but very few reports of such nuisances having been made to me.

HARTFORD—*The Annual Report.*

The general sanitary conditions of the city of Hartford are better than they were four years ago. Cases of diphtheria, scarlet fever and the like, are much more carefully and systematically quarantined, and the houses in which such diseases occur are better fumigated and cleansed than formerly. The fact that the disease has generally been confined to the dwelling or tenement in which it made its appearance, and did not spread in the immediate neighborhood, inclines one to the opinion that it has not spread by contagion or by personal contact, but that it originated, or was developed, at points remote from one another, and so far as could be ascertained, the cases, in many instances, had no communication or connection with each other. The cause of the disease was not always discoverable by our inspector or by the attending physician, and in some cases the local sanitation was as perfect as man at present can devise.

SEWERS.

We respectfully call the attention of your honorable body to the importance of having a careful and competent survey of the city made, to the end that at as early a day as is practicable, an adequate system of sewers may be constructed. In the older portions of the city a number of sewers exist that were originally intended only for drains to carry off sink water and perhaps surface water, but which in time were utilized to carry all the sewage. They are totally unfit for the purpose; they are not deep enough for the draining of cellars. In many instances they are poorly constructed, as would naturally be the case, when one recalls the purpose they were intended to subserve; and their capacity is not sufficient.

It will be noticed that the number of deaths from the diseases classed as preventable, is highest in the older portions of the city and in the neighborhood drained, or rather, partially drained, by this class of sewers. In our reports to previous Councils we

have urged attention to this very important matter. It is one that the most casual observer can readily perceive. That the sewers in these sections must be rebuilt, and in conformity with some general system, that shall speedily remove the sewage from the city, is a fact that no one would attempt to controvert, and the sooner the matter receives the attention it demands, the cheaper and better it will be for Hartford, both as regards money and health.

The inspector's report shows that a less number of nuisances have been complained of than in previous years, and that a less number have existed. We believe that the community at large take greater interest in keeping their homes and tenements in better sanitary condition than formerly. This is largely due to the individual work of the inspector, in giving instruction upon the subject in his daily rounds.

Sometimes the lesson has to be repeated more than once, but when at last it is learned, the person and his surroundings immediately show the good results.

CONTAGIOUS DISEASES.

An ordinance of the city requires that the attending physician report to the Board of Health all cases of small-pox, scarlet fever, diphtheria and typhoid fever. The Board furnishes the physicians with printed postal cards, and blanks in which can be filled out with little trouble. It is to be regretted that not all cases are reported, some physicians never having reported a single case. It is easy to see the value, in a sanitary way, of a knowledge of the existence and location of the preventable diseases.

Notice of the existence of all cases reported is sent from this office to the acting school visitor, and children from families where these diseases exist are excluded from the schools.

PUBLIC HEALTH.

Diphtheria has been present in this city for thirty years, and this year was the only prevailing contagious disease. It has not been confined to any special locality and is no respecter of conditions. Cases of direct infection were in nearly every instance confined to the tenements of the families attacked. Disinfectants were used freely, and any faulty condition of drains or plumbing was looked after.

HARWINTON—*N. A. Wilson, Clerk*, Reporter.

There is nothing of interest to communicate. No nuisance of contagious diseases has occurred during the past year to have called for official action.

There has been less sickness than usual. No deaths during the months of July, August and September. As winter approaches it may be well to remind people to be careful in the matter of storing vegetables, etc., in their cellars. See that the cellar is well ventilated.

KENT—*B. G. Pratt, Clerk*, Reporter.

The town is small and the people generally healthy.

KILLINGLY—*E. A. Hill, M.D., President*, Reporter.

There has been no epidemic disease that has required any meetings of the Board during the year. There has been diphtheria in some of the villages of the town, in which it has been necessary for the Health Committee to inquire into the observance of sanitary rules by the agents of corporations where the disease prevailed. The condition of cesspools and sink drains has been examined and the attention of such agents has been called thereto, any suggestions of the Health Committee have been readily assented to, and their orders obeyed, with marked improvement in arresting the spread of the disease and making the locality more healthy. A fire occurred in one of the villages last July, burning a barn and five horses. It became necessary for the Health Committee to take action in the matter and order the removal and burial of the remains of the horses, which was promptly done.

LEDYARD—*Isaac G. Geer, Health Officer*, Reporter.

Have had no business to perform.

MADISON—*J. H. Meigs, President*, Reporter.

The Town Board of Health have not been called upon to do anything the past year, and have not done anything worthy of note.

MANCHESTER—*C. W. Jacques, M.D., Health Officer*, Reporter.

There is nothing of importance to report as to the doings of our Board of Health. We have had no malignant or pestilential form of disease in Manchester during the last year that has necessitated the calling the Board together. As Health Officer I have been called upon in three or four instances to abate nuisances. There has been no call to convene the General Board.

MARLBOROUGH—*A. B. Latham, President*, Reporter.

Matters concerning the health of this town are in a satisfactory condition as far as the Health officers are concerned. Have endeavored to keep on the lookout for anything that would cause, or might be the cause, of contagious diseases. Have had no complaints entered thus far. We act consistently in the matter and have no trouble.

MIDDLETOWN—*D. J. Donahoe, President*, Reporter.

Our Town Board of Health did nothing but routine work during the year, that is to say, it simply met, organized and adjourned. The Health Committee met quarterly, but as there seemed to be nothing to do any more than to abate a few nuisances, that was all that was done.

MILFORD—*P. S. Bristol, Clerk*, Reporter.

During the year past only two or three complaints were made to the health authorities of nuisances, all of which were promptly abated by the Health Committee.

MORRIS—*James M. Benton, Clerk*, Reporter.

We organized and have found no occasion for our official service. Morris is noted for its healthfulness, and the past year has been unusually free from sickness except the ravages of La Grippe in the early winter.

NAUGATUCK—*M. H. Lawlaus, Clerk*, Reporter.

"La Grippe" has left its mark upon the vital statistics of our Town Clerk's books, and during the month of January it doubtless augmented our death ratio.

"Scarlet Fever" as an epidemic broke out spontaneously in the following districts: Sheffield Lane, Main St. (Union City), Hoadley St., Meadow St., and Cotton Hollow.

We have not been able to see that the various families in which it appeared were at all in social proximity. Three of these families had the doctor, one had no doctor until other cases appeared, not knowing that it was the scarlet fever that affected them, while the other family did not call a doctor as they felt capable of managing the cases alone, for they were confident in their diagnosis, and hoped by good care to bring them all safely through. In this they succeeded until they had spread the disease to nearly all the children in Cotton Hollow, on both sides of the brook, and by relaxing their vigilance too early, one of their children succumbed to the sequela of the disease in spite of the best efforts of a physician, at last called in.

The disease broke out in Church St. and on High St., Hopkins Hill, New Haven Turnpike and Bradley St. In all there have been 22 cases reported with 3 deaths, and only in one instance can direct infection be traced. So that we begin to see good effects growing out of intelligent management of the cases under the guidance of a regular physician and equipped with the additional directions concerning disinfection which the State Board of Health furnished, and which was distributed by your local board.

We shall thus hope in future to see the people so careful to stay the inroad of contagion, that Naugatuck shall contribute her mite to make it possible, by an intelligent combination on scientific principles to stamp out scarlet fever, and all other allied diseases.

Mumps has been noticeable among our adult population, in a very searching epidemic. So that those who had escaped several former exposures were stricken down with it in this.

Measles have been absent.

Röthlen appeared on the New Haven Turnpike in one family only.

Whooping-cough is interspersed through the town so that few who have not had it, still escape.

Chicken Pox has been noticed some.

Typhoid Fever has only shown up in the report of four cases.

Public funerals, where contagious diseases were the cause of death, are yet too thoughtlessly entered into; for more danger to

the living is thereby incurred than the truest intelligent wish of the bereaved can reasonably be expected to admit. So let the people consider this subject again, by reading Rule XV, herewith appended.

Sewage is being disposed of in a more creditable manner than heretofore. Several very important sewers have been laid by the town during the past year. One from Coen street through the cemetery, one from Spring street through Foundry road to Coal street, and thence to the Naugatuck River. There seems to be no system adopted as yet. Therefore we recommend the Selectmen to take this subject into consideration.

Scavengers are in demand in the seasonable months for their work. More efficient implements must be provided by them to satisfy a vigilant and sensible public criticism.

Hog pens should not be expected to remain in the proximity of civilized people unless kept scrupulously clean—and we are glad to note that there are fewer this year than ever before.

New Britain—*Annual Report of Health Committee for 1889.*

To His Honor the Mayor and the Common Council.

Gentlemen:—I herewith submit the annual report for the past year. While comparison with the preceding year shows a diminution of the mortality rate, yet, on the whole, the year was rather an unhealthy one. The number of deaths recorded is 310, or 15.5 per 1,000. During the preceding twelve months the number was 359, or 17.9 per 1,000. July is credited with 52 deaths, the greatest number for any month since the incorporation of the city. The cause of this is found in the prevalence of acute dysentery in an epidemic form. The disease made its appearance the first week in July, and continued unabated until the middle of August. An unusual amount of rain fell during this period, and it was a noticeable fact that with the advent of fair weather a decline in the disease showed itself. Although cases occurred in all parts of the city, they were especially numerous in the Third ward, more particularly on Grove, High, Washington, and Beaver streets. Your committee inspected this section at the time, but could find no cause for the greater prevalence of the disease in this locality. The whole number of cases (estimated) was about 250. The autumn months were marked by no unusual amount of sickness. The last week in December will be long

associated with the epidemic of "La Grippe." A large part of our population suffered more or less from it, and to it and its attendant complications is due the heavy mortality of the month of January of the present year. Following quickly upon the decline of this epidemic, we were threatened with another, and one far more to be dreaded. I refer to small-pox, which developed in a neighboring city (Meriden) early in February, and spread to such an extent as to cause much anxiety. Your committee, through the local press, warned the people of the danger and recommended vaccination as an efficient means of protection. Preparations were also made to deal with any cases that might occur. Happily, however, none appeared.

A NEW ORDINANCE.

Numerous complaints were received the past summer about the nuisance caused by swine in various parts of the city. Palliative means to abate the trouble were tried, but proved to be ineffectual. It became apparent that more radical measures were required. Accordingly, early in the autumn, a communication was addressed to your honorable body, recommending that the ordinance already existing relative to the matter be so amended as to prohibit the keeping of pigs within the city limits. This amendment was to take effect January 1, 1890. Such an amendment, specifying limit within which pigs could not be kept (the limits somewhat restricted from those recommended), was drawn up and finally passed. The necessity for such an ordinance was great, and I believe the beneficial effects of it will be appreciated the coming warm season.

GARBAGE.

For the past two years some effort has been made to improve the sanitary condition of the city by causing the removal of garbage from tenements and private dwellings. We cannot, however, speak in flattering terms of the success attending such efforts. The manner in which the work has been done has not been such as to meet the approval of those desiring to avail themselves of its benefits. And why? Simply because the money appropriated for this purpose falls far short of the amount necessary to prosecute the work in a satisfactory manner. Nor did it meet the approval of the Health Committee, since the amount of garbage removed was very small compared with the

amount uncollected, and consequently could affect the general health of the city only in a slight degree. Now this is the chief reason for instituting the work, and an expenditure which fails to accomplish this object cannot be regarded as otherwise than wasted. The remedy for these shortcomings, I think, can be stated in two propositions: First, make a larger appropriation; secondly, make it obligatory upon all to have garbage removed. By these means will an efficient service be secured, and one which, in a sanitary point of view, cannot prove a failure.

NEW FAIRFIELD—*H. H. Wildman, Clerk*, Reporter.

There has been no action of the Board the past year. No by-laws have been adopted.

NEWINGTON—*Louis V. Durand, M.D., Health Officer*, Reporter.

Although there were no formal meetings of the Board during this year yet there were frequent consultations between the officers and members of the Board. The work of the Board has been for the most part advisory. Where dirt or filth were known to exist or suspected, examinations have been made and when discovered their removal insisted on. Due attention has been paid to drainage to outhouses, etc.

In fact everything has been done as far as possible to accomplish the purposes for which the Board was established.

NEW LONDON—*George C. Strong, President*, Reporter.

It will be difficult for me to give you any correct idea of the work accomplished here during the past year. We have one officer detailed to work under our directions. He examines all premises and if necessary issues orders by our directions for cleaning the same. There were a large number of such orders issued. By our orders he also looks up all complaints of whatever nature that come to us. We also look after all cases of contagious diseases reported by the physicians, and isolate them if it seems best to do so. An item of record is made of all such cases and all orders issued, but we have not attempted to compile them in form.

NEW MILFORD—*Jas. C. Barker, M.D., Health Officer*, Reporter.

The Board of Health of this town have had no business this year. (The town is very healthy).

NORFOLK—*J. C. Kendall, M.D., Health Officer*, Reporter.

The only occasion that has required my action as Health Officer during the past year was a neighbors' dispute as to the drain that carried soapsuds and blue-water on Mondays from one house by another, wherein no legal action was warranted.

NORTH BRANFORD—*Edward Smith, Clerk*, Reporter.

The sanitary condition of this town for the past year has been such as not to require any special action of the Board of Health.

There have been no cases of malignant diseases, and the action of the Health Committee has been confined to abating one or two nuisances.

NORTH HAVEN—*R. B. Goodyear, M.D., Health Officer*, Reporter.

The Board of Health for the town of North Haven for the year ending Oct. 1st, 1890, have held three meetings, one for organization and two specials, the latter being held for the consideration of a petition signed by fifty or more of the residents of Montowese, praying for the abatement of an establishment located near the public highway and in close proximity to the village aforesaid.

The petition set forth the following complaints, in substance, viz: That a certain bone-boiling factory, owned and operated by Messrs. M. E. Hemingway & Sons, was a nuisance to the inhabitants, whose dwellings were permeated with an unpleasant and sickening odor, emanating from said establishment, to the great injury of property and the discomfort of residents in the vicinity.

The Board of Health advised the Health Officer to inspect the aforesaid factory and request the proprietors to modify the conditions so as to make it less objectionable to those living near it.

The Health Officer, after repeated inspections and conference with the proprietors, was able to report at a subsequent meeting of the Board of Health that the conditions of the nuisance had been improved and modified; that the boiling process had been carried on at night instead of in the daytime and was less objectionable. No further action was taken in the matter.

There have been a few cases of diphtheria, but physicians have not reported their contagious cases.

NORWICH—*L. S. Paddock, M.D., Clerk*, Reporter.

Our first duty was at Taftville, a manufacturing village on the Shetucket river about three miles northeast of Norwich. There we abated a nuisance caused by a privy and hen-house too near adjoining premises, and producing an offensive smell. In the city the Franklin Street brook has long been a source of trouble. The city has used it as a sewer; but on account of many complaints arising on account of this use, at a public meeting held a few years ago, it was voted to abandon the brook. Still the brook flows, as it always will, and is a receptacle for so much offensive matter that numerous complaints have been presented to the Health Committee and asking relief from the nuisance. During July we had several meetings and one in conference with interested parties, endeavoring to do what seemed best for all. The final result was that an order was issued by the Health Committee to compel all persons using Franklin Street brook for a sewer to discontinue its use on or before Oct. 1st. Some have obeyed the order and made connection with the city sewer. Legal steps have been taken to compel others to obey. I ought to say that on account of this long-continued complaint the city, at our solicitation, had opened new sewers in the street.

During the month of October diphtheria of a malignant type broke out in Taftville and caused numerous deaths. The disease prevailed mostly with the French Canadians. Not aware of the danger, they had visited freely together, and the children had not been excluded from the schools; I allude, of course, to those from infected houses. The Health Committee took immediate action to abate the sickness and avert the threatened danger. We ordered the cesspools and privies to be thoroughly disinfected; children from infected houses to be kept from school; that the priest and village school teacher should see that this was enforced; that there should be no public funerals, and that the undertaker should use the *hearse only* for conveying the dead, and that the burial should be as soon as possible after death. The superintendent of the mill aided us in every possible way, and furnished a guard over the premises. Through these agencies the disease was at once suppressed, and not a single case has

come to our knowledge for several weeks. I do not think it now exists there.

I think this comprises all of our official work during the past year. At present we are very quiet.

OLD SAYBROOK—*J. H. Granniss, M.D., Health Officer*, Reporter.

My work as Health Officer has been mostly advisory and suggestive as to the location and care of sink drains, water closets, etc., sometimes sought by the parties interested, but more often offered and urged as opportunity occurred.

I believe there exists a growing tendency among our people to give more intelligent attention to matters of hygiene.

During the autumn scarlet fever has occurred in two families, in the one case affecting six children, and in the other two. The type of the disease was mild, and there were no deaths to record. The details of disinfection as advised in your printed circulars were carried out in each house, and no further cases have occurred.

About the middle of September typhoid fever commenced in a family and prostrated four members. Only one case could be called severe, and all recovered. I failed to trace the source of contagion in the first case. In all the cases the excreta were passed into a solution of copperas and buried immediately.

PLAINFIELD—*William J. Hyde, Clerk*, Reporter.

The sanitary condition of this town has been such as not to require any special action from the Board of Health, no complaint having been made of any malignant diseases.

The hilly character of the town in general easily secures good drainage into the rivers, which, though beneficial to the premises drained, is doubtless not so to the streams into which the drainage runs.

The public health has, in general, been good.

PLAINVILLE—*J. N. Bull, M.D., Health Officer*, Reporter.

I have nothing of importance to report. Only a few minor matters were brought before the Board. As Health Officer I had very little to do in the year.

PLYMOUTH—*Edwin M. Talmadge, President,* Reporter.

An outbreak of scarlet fever began May 1, which resulted in four deaths. The Board did what they could by way of quarantine and ordering private funerals. Six houses have been quarantined the past year, one of which was on account of diphtheria. Request was made that the notice remain up until the patient had sufficiently recovered to be strong enough to see the many friends desirous to call, thus showing that they appreciated the action of the Board of Health. One family being Polanders, and not fully comprehending the powers of the health officers, shortly after a death in the house from scarlet fever, and before released from quarantine, attempted to attend the dedication of the Eagle Lock company's new factory, where over one thousand people were to assemble; but were ordered home, to remain until fumigated, which was done next day. Many complaints of less importance than those named have received attention. Complaints of privies, pig pens, and sink drains have been looked after. As the people understand the object and benefits of a Board of Health the greater will be the good accomplished.

One other case is that of Jennie Oviatt, living with her foster mother. The girl is ten years of age. A doctor from Bristol was called and reported to the Board that in his opinion it was a case of scarlet fever; could tell better next morning. We went with Dr. Swett to see the case, and it was decided to remove the patient that night to a place remote from all children. Two hours later found her on the same bed three miles distant. This was for the protection of a large number of small children in and near the house she was removed from. The case was a mild one, and the bill made as reasonable as possible; but who is to pay the bill is a question on which the Selectmen and Board differ.

PORTLAND—*C. A. Sears, M.D., Clerk,* Reporter.

There was very little for the Town Board of Health to do the last year. They removed a few nuisances, such as pig pens, etc. We have not had any epidemic that needed their services.

PRESTON—*Hugh King, Clerk,* Reporter.

The sanitary condition of the town during the past year has been such as to cause only a few complaints to be made to the Board of Health. These were investigated and promptly abated.

REDDING—*John W. Nickerson, Clerk*, Reporter.

So far as the town of Redding is concerned, there has not been the first thing done. A creamery in town allowed over a thousand quarts of milk to be turned into a small stream running parallel to the highway during the spring and summer, and created such a stench that the usual summer boarders left the town. It also caused some sickness in the neighborhood; and, although repeatedly complained of, the nuisance continued so long as the owners of the creamery had no market for their skim milk. But we live in hopes that now with our new Health Officer (lately appointed by the State Board) something will be done. Our record is, what has not been done—not what has.

RIDGEFIELD—*Hiram K. Scott, Clerk*, Reporter.

Our Town Board of Health had no business before it during the past year.

SALEM—*C. F. Congdon, M.D., Health Officer*, Reporter.

The Board did but *little*, and *nothing of any value.*

SAYBROOK—*E. Bidwell, M.D., Health Officer*, Reporter.

There has been no occasion for the action of the Board of Health in this town during the last year.

SHARON—*Willard Baker, Clerk*, Reporter.

Very little was done last year. We had an epidemic of whooping-cough, and the Board met and issued a request to the residents of the town charging all to try to confine the disease as far as possible and prevent its spread. This is all the action that was taken in any matters.

SPRAGUE—*Thales I. Stanton, M.D., Health Officer*, Reporter.

The Health Officer of the town of Sprague had but little to do during last year, due principally to the depopulation of the town by the burning of the Cotton Mill three years ago, and failure of the Versailes Woolen Co.

There were four cases of diphtheria in different months in two families ; prompt action prevented its spreading. There have been a few complaints of nuisances that were abated by speak-

ing to those creating the nuisance. The connecting of the sewage of the Convent of the Holy Family with Beaver Brook will improve the health and better the condition of the village, which is at present one of the healthiest villages in the State, as the death-rate gives evidence.

STAMFORD—*F. J. Rogers, M.D., Health Officer*, Reporter.

Would beg leave to report as follows :

Nuisances reported	44
Premises inspected	20
Wharves inspected	1
Dead horses removed	2
Fumigations	11
Fumigations ordered	5
Public dumps inspected	30
Public funerals of contagious diseases prevented	4
Pig-pens removed	3
Nuisance notices served	73
Dead cats removed	3
Marsh drained	1
Gutters opened	2
Swill and water closet nuisances abated	11
Monthly communications made	20
Yearly communications made	1
Inspected ponds and rivers	6
School houses disinfected and fumigated	6

Having had several cases of scarlet fever and believing that the school house in many cases bore at least a suspicious character, I fumigated and disinfected six school houses, containing about 1,700 pupils. In many cases of epidemic and children's diseases I think the school house is frequently at fault.

STERLING—*C. N. Allen, M.D., Health Officer*, Reporter.

There have been no meetings of the Sterling Town Board and no transactions during the past pear.

STRATFORD—*G. F. Lewis, M.D., Health Officer*, Reporter.

Since the time when diphtheria was prevailing at the Children's Home the Stratford Board of Health has had little to do excepting a few minor matters. We held several meetings in June, however, to consider the complaint of Mr. William Strong. A slough in the adjoining field, a few rods from his house, in the

summer when nearly dry, emitted a stench which was far from pleasant and decidedly unhealthy.

Mr. Strong complained to the Board of Health to compel the owner of the property to fill up the slough. There was no doubt as to the slough being a breeder of malarial diseases, but as it was a natural formation the Board of Health had no jurisdiction to abate the difficulty, at least they so decided.

[See page 23 of the report for opinion of the State Board.—C. A. L., Sec'y.]

SUFFIELD—*J. K. Mason, A.M., M.D., Health Officer*, Reporter.

In relation to the doings of the Town Board of Health the past year, I would report that in January last a man came into town from Windsor Locks who had been seriously exposed to small-pox which prevailed in that town at the time. Shortly after symptoms of the disease appeared in this man, and he was promptly returned to the pest-house at the Locks whence he contracted the disease. Other parties exposed by him were *quarantined* for two weeks, and quite a considerable number of those less exposed were vaccinated by order of the Health Officer. Fortunately no other case appeared in this town and the scare was soon over.

No other case of infectious or contagious disease has appeared to call for any action of the Board the past year.

This with the abatement of sundry minor "nuisances" is all I have the honor to report.

THOMPSON—*L. Holbrook, M.D., President*, Reporter.

The Board was duly organized at its annual meeting by choice of officers and have had careful supervision of the sanitary condition of the town, have been active in recommending necessary precautions for maintaining healthful conditions when they have observed neglect of the same—insisting upon careful attention to cleanliness; in removing all filth from streets and dwellings, particularly in our densely populated manufacturing villages, and with the gratifying result of obviating epidemics of contagious diseases often occurring in such places, so that no diseases of such nature, either scarlatina, diphtheria, or typhoid fever have been known this year in the town. They have been called upon to investigate only *one* suspicious case of faulty sewerage, and

direct its removal. I am gratified to be able to say our people generally have willingly acknowledged the authority of the Board and coöperated with it in the compliance with its advice and directions to the end of obtaining the objects of its existence. The work of the Board has thus been fruitful in a marked degree in promoting that exemption from all forms of zymotic disease which has made the sanitary condition of this town so much better than that of past years in which more or less of these diseases have prevailed. The contrast in this report with years past has been such as to excite general remark and surprise among our people, and a growing appreciation of the value of Health Boards and the regret that the blessings of scientific sanitation have not sooner come in the form in which they are now enjoyed.

TORRINGTON—*H. J. Pulver, M.D., Health Officer,* Reporter.

I am pleased to report that we have been free from any epidemic of contagious disease and that our Board has had little to do. Our town has been recently sewered, our people are fast connecting therewith, thus doing away with earth-closets and cesspools. On the whole the sanitary condition of our town is good.

VOLUNTOWN—*W. R. Davis, M.D.,* Reporter.

The sanitary condition of our town has been such as not to require any special action from the Board. There has not been any malignant diseases except some few cases of diphtheria. These have been carefully handled by the doctors without any assistance from the health officers. Isolation and disinfection are enforced as much as possible. The Board has been looking after sink drains, pig-sties and privy vaults more than formerly. There are, however, some few nuisances that the present Board will endeavor to get rid of at an early date, in the spring. The public health has in general been very good, and we thank the Good Giver of all good gifts that there has not been any epidemic in our town.

WARREN—*J. B. Derrickson, M.D., Health Officer,* Reporter.

There have been no epidemics. This town has been peculiarly exempt from sickness the past year and the Board has had no occasion to interfere in the abatement of any nuisances. The local-

ity is healthy, the people intelligent, and I think generally have used proper precautions in sanitary matters, such as drainage, the cleaning of privies, and the purity of water, etc.

WASHINGTON—*O. Brown, M.D., Health Officer*, Reporter.

Nothing was done except the appointment of Health Officers.

WEST HARTFORD—*E. T. Stanley, Pres.*, Reporter.

Two meetings were held for the transaction of business, and the remainder of the work accomplished was performed by the Health Officer. His services have been demanded in eighteen cases, divided as follows :

I. SPECIAL NUISANCES.

Defective drains and cesspools	4 cases.
Filthy pig-sties	2 "

II. CONTAGIOUS DISEASES.

Typhoid Fever	2 cases.
Scarlet Fever	2 "
Diphtheria	8 "
Total	18 "

The first four cases under Class I were all in very bad condition and dangerous to the occupants of buildings wherein they occurred. By action of the Health Officer, three are now in good sanitary condition. In the other case, the owner rather than comply with the requirements of the Board, caused the tenement to be vacated. One case of pig-sty is still pending.

Work under Class II, when possible, has been confined more especially to giving directions for proper disinfection, isolation of patient when necessary, prevailing sanitary condition, and attempts to trace source of contagion. This work, however, has been imperfectly accomplished because most of the cases did not come to the notice of the Health Officer until some time after their occurrence, and then rarely through the proper channel. (See "W. Hartford B. of H. Rules," p. 6, Rules X and XI.) The power conveyed in Rule XIX, p. 8, for the enforcement of the foregoing rules has not been exercised, evidence showing that non-compliance therewith was always due to ignorance of their existence. The recent adoption of rules and the difficulty of in-

forming alien physicians of their existence, have in the past appeared to be mitigating circumstances to cause the Board to be lenient in exercising some of its powers. The time has, however, arrived for the Board to exercise its full powers, and in the future all delinquents should be punished to the full extent of the law. The necessity of doing so becomes plainly evident when considering the recent death of a citizen of Hartford, probably due to drinking water from a well located in this town where on the same premises three cases of typhoid existed last summer. None of these cases were reported and the attention of the Board was directed thereto by the notice of the Hartford man's death above referred to. At this late date an inspection was immediately made, disclosing a most dangerous condition, greatly justifying the belief that this well was the source of contagion. Had the Board been notified when the first case occurred, 'tis fair to assume that no such fatality could have occurred, for they should then have rendered impossible contagion from this particular well. This case and another to be recorded, clearly demonstrate that the Board has gained little by its liberal policy, while the people for whom it was created have suffered.

In looking for the source of contagion, one case of typhoid was probably taken in this town, the other being contracted in New York. In one case of scarlet fever no satisfactory evidence was obtainable, while the other was probably contracted by the patient having visited considerably at a house in which scarlet fever prevailed last year, and in which case both parties respondent thereto neglected to report. The existence of this case did not come to light until the Health Officer was trying to find the source of contagion for the case duly reported. This is another instance where the neglect to report a case resulted detrimentally, though not so intensely as to produce death. Four of the eight cases of diphtheria were probably contracted in Hartford and the remaining four proved ultimately not to be so.

WESTPORT—*L. T. Day, M.D., Clerk*, Reporter.

The doings of the Health Officer consisted for the most part in ordering decomposing matter disposed of and out-houses cleaned and disinfected.

WETHERSFIELD—*E. G. Fox, M.D., Health Officer*, Reporter.

The Board of Health of our town has had little to do during the past year. Complaint was made in town of a bone-boiling establishment as a nuisance. I visited it and in a short time the trouble was remedied.

WILLINGTON—*W. L. Higgins, M.D., Health Officer*, Reporter.

The members of the Board have been active in looking after the sanitary condition of the town ; that there have been no epidemics of infectious diseases. Two cases of this class, however, have been reported. In that portion of the town known as South Willington, which is a compact village containing nearly 300 persons, there were two cases of typhoid fever, the first one occurring about the middle of August, the supposed cause being the taking up of an old sink drain for the purpose of putting in a new one. The second case occurred early in September and was probably one of contagion, but isolation of the patient, strict observance of anti-septic rules, disinfection and burying of the stools resulted in a prevention of the further spread of the disease. The natural situation of the town, the scattered populace, the hearty coöperation of the people with the Board in maintaining healthful conditions may explain in part why we have been so free from zymotic diseases.

WILTON—*A. B. Gorham, M.D., Health Officer*, Reporter.

The general sanitary condition of the town has been good, not requiring any special action of the Board.

WINDSOR—*Newton S. Bell, M.D., Clerk*, Reporter.

The Board of Health of Windsor was duly organized, but during the year ending Nov. 30th, 1890, there was nothing that occasioned the calling out the Board as a body. There were only small matters easily rectified and not worthy of a report except in one instance, the outbreak of diphtheria. There were five cases of malignant diphtheria, four of which have proved fatal. They are all in one family who have been quarantined and all measures possible have been taken to prevent any further spread of the disease.

WINDSOR LOCKS—*John P. Healy, Clerk*, Reporter.

Our Town Board of Health have done virtually nothing different from former years except to pass an order relating to keeping and maintaining hen-coops and pig-pens. After January 1, 1891, no hog-pen can be used or maintained within 200 feet of any dwelling, and must be abated on complaint made, and no hen-coop can be kept, etc., as above, within 100 feet of any dwelling. There was provision also made for no garbage to be deposited upon any public place, and that all privy vaults shall be cleaned once a year on or before May 1, 1891, and each succeeding year, and any time upon complaint as to the offensive condition of same.

The small-pox outbreak has been reported to your Board and the precautions taken to prevent its spread.

WOLCOTT—*J. Henry Garrigus, Health Officer*, Reporter.

Wolcott's Board of Health was organized according to law, and a Health Officer appointed for 1889. Twice the health of the town has been threatened. Early in the year diphtheria broke out at Mill Plain in Waterbury, a district joining our town. We discontinued the S. S. school held in that place and prevented our children from coming into contact with those of that locality. No serious results followed.

We quarantined against the small-pox in Meriden and placed ourselves in readiness to act promptly in case it appeared in our town.

The sanitary condition of our town is in the main satisfactory.

In the fall a family moved into Wolcott from Mill Plain in Waterbury, one of whom was taken down with diphtheria. The house was quarantined and as it was remote from any other house no other case appeared.

WOODBURY—*H. W. Shove, M.D., President*, Reporter.

The Board of Health of Woodbury have not been called out officially during the year. Have made suggestions on various occasions relative to sanitary improvements about some of the school buildings of the town. All have been cheerfully carried out.

NEW HAVEN—*Frank W. Wright, M.D., Health Officer.*

(Received too late for insertion in proper place.)

This year we have given more attention to contagious diseases than ever before. We have intended to visit every such case reported to us. Our purpose was to supplement the directions of the attending physicians with such advice as was proper to come from the health department. We have endeavored to impress upon our citizens the necessity of early and complete isolation in all cases, but unfortunately this is not always possible in large families, who are inconvenienced for room even in health. I think I can truthfully say that there are but very few cases where no attempt is made to more or less isolate the patient. There has been a great change among the inhabitants of our city in regard to disinfection. Where formerly people only suffered an imperfect disinfection, they now demand that it be done as thoroughly as we are able. Of course we do not have a chance in every case to do it ourselves, many preferring to do it themselves after the manner we advise, but the number of requests made at this office, for disinfection to be done by the employees of this department, is fast increasing. Nearly one hundred places have been fumigated by us during the past year. We are aware much has been said against the effectiveness of sulphur fumes as a germ destroyer, yet we believe it is the best that can be done under the circumstances. We are not able to follow such rules as were adopted by this board some months ago, as we have not a sufficient appropriation allowed us to buy disinfectants or pay for the extra amount of labor. I can recall, as I state in my report to the local board of a re-occurrence of a contagious disease, in but two instances after we have fumigated in a manner satisfactory to ourselves. We do not recommend in any case fumigation as all sufficient, but advise cleansing of rooms, fresh paint and paper if possible, beating and airing of carpets and hangings, and that all clothing be soaked in a strongly carbolized solution and well boiled.

We have had reported at this office for the eleven months end ing November 30, 1890, one hundred and sixteen cases of typhoid fever. Outside of a few cases in close proximity to each other in Fair Haven, this disease has been pretty equally distributed over the whole town. There has been no positive evidence of its source in any case, but in several instances strong suspicions have pointed to its origin, and upon taking such steps as we thought

indicated, we have in every case been pleased with the results. Two hundred and sixty-nine cases of diphtheria have been reported up to December 1st, 1890, with ninety-one fatal cases. This disease has not been so prevalent during the latter part of the year as it was earlier, nor has there been as much as there was during the corresponding months of 1889. In June the Carlisle Street School was closed, as there appeared from the number of children taken with the disease, who attend school there, evidence, as we thought, to believe that diphtheria was being communicated to the scholars through the use of the building or by children attending that school. Scarlet fever has been running a very mild course and has been comparatively uncommon. There have been eighty-three cases, with only three deaths, until December of this year. I am of the opinion that scarlet fever and diphtheria are spread more through the schools than in any other manner.

SECRETARY'S REPORT.

By C. A. LINDSLEY, M.D.

Secretary's Report.

Until within the present century there were few, if any, cities in the world of which the population exceeded 1,000,000 people. All large communities living in close proximity in former times were subject to such frequent and fatal epidemics as to prohibit an increase of population in one locality beyond that number. Diseases were then universally regarded as being the dispensations of divine providence or the manifestations of divine displeasure. It was not formerly believed that they could be averted or escaped from by any devices of man or by any human agency.

Sanitary science is of comparatively modern origin.

So-called civilization is a product—it is a development—an evolution, in the popular language of the times. It is a growing, ever-changing, progressive result of conditions, of circumstances. Like all growths subject to natural laws, it is not one in which exact uniformity of increase takes place in all its parts in the same time. Civilization is like a tree with many branches. Almost within the last generation the hitherto small and scarcely recognized twig called sanitation has taken on a more active growth, and in the last score or two of years has become a most vigorous and important branch of the great tree of human progress.

In all the advanced nations of the world sanitary science is being more or less recognized as a potent factor in the welfare and prosperity of the people. Connecticut is well in the front, abreast her sister states, in this recognition. She has her State Board of Health and her local boards in towns and boroughs and cities. Her system of public hygiene is such that the executive administration is in every part of the State imposed upon the local boards. As these are in all instances quite separate organizations, and in the case of cities and boroughs are each organized on the conditions required by their respective charters; and as each possesses an independent and exclusive authority over its own limited territory, without any defined relations to neighboring jurisdictions, except those of amity and a common object, it

follows as a natural consequence that the execution of sanitary law and the practice of public hygiene being thus wholly dependent upon the discretion of local disconnected and independent boards, must be widely different in different localities. In one town the local board will be alert and vigilant to detect unsanitary conditions subject to its control, and prompt and judicious in the exercise of its authority; in another, perhaps adjacent town, the local board will be equally distinguished for its inaction, indifference, and possibly for its incapacity.

Precept and example are the active forces which are doing much to remedy these defects, and are probably as potent in their influence as any agencies that can be employed under the existing system of sanitary administration.

There is no town, borough or city in Connecticut which has not a legally appointed health officer or health committee, fully authorized to act decisively and promptly in all cases properly under the control of sanitary law; and there are very few, if any, towns in the State wherein the said officials do not appreciate to some degree (far more than formerly) the responsibility of their position, and who do not discharge with more or less fidelity the duties of their office. In these respects a marked and steady progress can be demonstrated in the last few years.

Before the organization of the State Board of Health the prevailing conception of the functions of a board of health was simply this—to protect the public from the spread of small-pox. In a large majority of the towns of the State, official action as a board of health was never taken except in the presence of that threatened danger. That any other conditions or influences prejudicial to the public health ought properly to come under their supervision and control did not seem to be considered or appreciated.

All this is much changed of late. The State Board no longer gets communications like the following:

"Our Town Board of Health has had nothing to do in the past year, as there has been no small-pox in our town.

"Respectfully, ----------,

"*Pres. of Board of Health.*"

Sanitary Regulations.

Per contra, a commendable number of the local boards have enacted sanitary regulations for their respective jurisdictions, which not only aim to control and prevent the most common and frequent unwholesome nuisances relating to drainage, accumulated filth, defilement of water supplies, etc., but also make compulsory the notifications of infectious and contagious diseases; and a few of the larger towns give constant employment to one or more sanitary inspectors. This is practical and substantial progress.

The prominent feature of the Connecticut plan is the making each local board within its own jurisdiction the executive of sanitary government. All these boards are authorized to enact sanitary ordinances, which when duly published have the validity of law. Although the local boards are fully empowered to act under the authority conferred upon them by the general statutes without published ordinances, yet, as a matter of fact and experience, their work is greatly facilitated by a published code of sanitary regulations. Such a code judiciously and comprehensively devised is not only an instruction to themselves and the people under their supervision, but a seemingly additional authority for their official action. The State Board not long ago prepared a system of sanitary law, as a suggestive code, for the needs of small towns. It is gratifying to be able to report that many boards in the State have adopted it with such modifications as their special circumstances seemed to require.

Sanitary Inspectors.

Of all the aids to good hygienic results which boards of health can employ, there is none which exceeds in value that of a good sanitary inspector. If he is the right man for such an office, one who is judicious, not seemingly officious, not offensively arbitrary and dictatorial, but possessed of what is called "tact," he becomes at once an instructor, a detective, and a reformer. The very fact of the existence of such an officer in a village has a salutary effect. In many instances he will find the work he is set to do already done before he reaches it. In anticipation of the visit of such an official, the neglected cellar is cleaned and whitewashed, the garbage heap in the back yard is removed, and

everything made tidy and neat, just as the good housewife sets her house in order when expecting company; or, the thoughtless householder is shown how his leaky drains and ill-advised methods of sewage disposal are threatening pollution to his water supply and endangering the health of his family.

There is little doubt that the occasional visits of a well-informed and trained sanitary inspector to every house in a village would prevent more sickness than five good doctors could cure, and save more lives. As a pecuniary investment, there are far better dividends from money paid for sanitary inspectors' salaries than from that paid for doctors' fees.

The most prevalent heresy now existing among the health officials of the small towns of Connecticut is a deep-rooted skepticism as to the real need of their official existence. Because from year to year they do nothing, they take the unjust inference that there has been nothing to do, which is equivalent to saying that the towns over which they have sanitary supervision are now and have been for many years in such excellent hygienic condition as to be incapable of being improved. That the drainage of these towns and of every house is so good as never to be a source of danger to health. That every citizen gives such careful and intelligent attention to the disposal of his sewage and other household wastes, that there is no possibility of unnecessary soil contamination about his dwelling, or risk of pollution of his own or his neighbors' well. That kitchen slop-puddles and vile cesspools do not exist. That all barn-yards, hen-roosts, and pig-styes are kept with such scrupulous care as never to pollute the air by their emanations or be a source of defilement to the neighboring streams. That the food products, and particularly milk, are always supplied to customers in the most wholesome condition. That all dairy farms are conducted on the best methods for securing the health of the cows and avoiding every risk of infection of the milk. That when contagious diseases are brought into the place (for they could not originate in such towns), ample and ready provision is made for taking all the precautions necessary to prevent their spread. There may be such towns, but they are not in Connecticut.

Another fallacy, closely related to the last, is the idea that a local board of health should be a *passive* rather than an *active* organization. That of its own volition it should never take cognizance of any unsanitary conditions. That a town board should

occupy the dignified position of a court of appeal, and take no action, whatever may endanger the public health, until the threatened danger is brought to its attention by other parties. Such a conception of the true functions of a health board are not in conformity with the practical sentiments of the times.

In order to accomplish the purposes of its existence it should be just the reverse of passive. Every member of the board, or at the least its executive officer, should make it a first duty to acquire a familiar personal acquaintance with every part of his town with regard to its sanitary conditions. He should observe and note what influences, if any, affected public health, what parts were most unhealthy, and what may be needed to improve the conditions. Immediately when an intelligent and competent officer begins such observations he always finds enough material to make it interesting.

It is true that in Connecticut the very meager stipends offered for such services (often next to nothing, and still oftener really nothing) are not great incentives to active exertion; but that is no reason why an aggressive administration of public hygiene is not needed, or why it should not be paid for as well as other useful public services.

For several years it has been the custom of the Secretary to inspect, as opportunity offered, more or less of the popular places of summer resort for which the coast of Connecticut is getting to be widely known ; and also some of the public institutions of the State. During the past season I have made a few such inspections.

Places of Public Resort.

Of some of these popular resorts too much cannot be said in commendation of the efforts of those in charge to make their places and surroundings models of sanitary management, while some others are deserving of such condemnation as should prohibit their occupation until some radical reforms were established. Between these extremes there is every grade of sanitation possible.

The following extract from my note-book is descriptive of some of the hotels in one locality: "The location of all these hotels was so much elevated and so near the sound as to afford every needed facility for good drainage. The approach to them presented an interesting and attractive appearance in every instance, their commanding site giving a pleasant view of the Long Island

sound, whose broad surface, diversified by scattered islands with green or rock-crowned surfaces, tempted every visitor to stay. While the fronts of these hotels were so alluring to the stranger, the rear and unseen surroundings, to which guests were not admitted, presented an equally repulsive appearance. The prominent features behind the kitchens and outhouses, were uncovered drains, vast open or half-covered cesspools, ground saturated with laundry and kitchen slops and the defilements of ill-kept privies." The term "health resort" applied to places like these is an exceedingly bad misnomer.

When will people learn to use the intelligence with which most are endowed in sufficient amount to enable them to see and observe for themselves, when they are seeking a place for a summer vacation, that the place they propose to go to will not rival in filth accumulation the wretched tenement houses of an overcrowded city population. A reform would soon be effected if the guests of our watering places and other summer habitations would demand, as a condition of their patronage, that the rear and hidden part of the premises they temporarily occupy shall be as clean as the front.

There are plenty of clean, wholesome, healthy places among the many shore summer houses of Connecticut, but I am sorry to say they are not all to be so regarded. But the good public who support them have a right to demand that they shall be kept in such a manner as not to imperil health.

The Litchfield Jail.

During the summer I visited this ancient and time-worn institution. Its chief defects are those of size and construction. At certain seasons of the year it is greatly overcrowded; but the care and vigilance displayed by the prison warden in making the best of bad conditions deserves only commendation.

As a member of the Fairfield County Temporary Home for Dependent and Neglected Children, representing the State Board of Health, I attended a meeting of the Board of Managers, at Norwalk, on the 5th of April, 1890. This was the last one of many meetings previously held in various parts of Fairfield county, to view and fix upon a site suitable for the erection of a building properly adapted for the wants of the "Home."

At this meeting a location was shown the management which seemed to fill all the requirements thought necessary better than any other hitherto found, and it was decided to accept it provided the cost did not exceed the means at our disposal.

The following is a report of a visit to the

School for Imbeciles at Lakeville by the Secretary.

I visited this institution on Tuesday, July 22d, 1890. I was disappointed in not meeting the superintendent, Dr. Geo. H. Knight, who was absent, attending the Medical Congress in Berlin, in Germany. I was, however, courteously received by the officers in charge and kindly aided by the matron in making my inspection of the premises. Every facility was afforded me in examining the sanitary condition of the house and grounds, which was possible in a brief visit and somewhat cursory inspection. All inquiries were promptly answered, and I was enabled to form, I think, a just estimate of the school and its surroundings, from a hygienic standpoint.

The building is well adapted to the purposes for which it is used. It is well located upon elevated ground overlooking the lake, and having every facility for good drainage. The rooms were well lighted and ventilated. One or two of the dormitories were a little overcrowded. The school-rooms seemed of ample size for the seats provided, with sufficient supply of light and air, and comfortably and suitably furnished.

The water closets were connected by corridors with the main building. They were satisfactorily constructed with suitable and sanitary appliances. They discharged in common with the other sewage of the establishment into a large cesspool about 100 feet from the house and near the shore of the lake.

An automatic arrangement was in operation by which the water closets were flushed every 15 minutes from a tank of water in the top of the building; the tank is kept supplied by pumping from the lake.

The water supply for potable purposes is received from a natural spring, conducted to the house through pipes, and was stated to be of exceptional purity.

At the time of my visit the school, I was told, was enjoying a vacation, and I saw only one or two of the pupils, who were too ill to be out.

The average annual attendance was said to have been more than 100 for the last ten years. The number in attendance during the last year was 130.

I was informed that the attendants employed during the school months numbered about 30, including teachers and house servants.

Two large farms were said to be cultivated for the use of the school, thus securing abundant and good dairy products and fresh supplies of vegetables.

Although the time of my visit was somewhat unfavorable for the most satisfactory inspection, yet I was very favorably impressed with the general cleanliness of the place and the seemingly vigilant attention which was given to hygiene.

Small-pox in Meriden.

February 12th, 1890, I was notified by telephone that six cases of small-pox had been discovered in Meriden. This information was given by Dr. Wilson, Health Officer of the town. The small-pox cases were all within the city limits. The day following Dr. Wilson wrote that there were seven cases, and that a conference of the City Health Committee and the Health Officials of the town would be held at the City Hall in the afternoon, and requested my attendance.

Complying with the request, I went to Meriden and met the two Boards.

The Mayor of the city presided. Although the patients had been sick several days, just how many I could not learn, there had as yet been no systematic efficient precautions taken to protect the public from the spread of the disease.

An embarrassment had occurred in consequence of the double government of Meriden. There is a *Town* Health Officer and a *City* Health Committee, each having undefined powers and responsibilities. It became at once a delicate and difficult question to decide which authority, the *Town* or the *City*, should take the expense of caring for the small-pox victims. Upon this question the representatives of the *City* Common Council and the Board of Selectmen of the *Town* held different views. The controversy was the more absurd because it did not make an appreciable difference to the tax-payers whether the expense was paid from the Town or the City Treasury.

In the meantime the patients were not receiving proper medical care, there being a doubt whether the *Town* Health Officer or the *City* Health Committee had official oversight of them. It was stated to me at the meeting that some of the patients had received no medicine or other care for 24 hours.

The *City* Committee, through its chairman, had ordered the patients, the day before, to be all removed immediately to the "Pest House," which belongs to the *town*, and is outside the city limits.

The *Town* Health Officer had forbidden the transfer, because the so-called "Pest House" was not in suitable condition to receive them; not having been occupied or opened for several years, and being in a very damp and dirty condition.

So far as I could ascertain, some of the inmates of the houses where the small-pox existed, had been vaccinated, but no thorough and general vaccination of all who had been exposed had been carried out or attempted. The reason given me was that nobody knew whether the *city* or the *town* would pay for it, or if it would be paid for at all, as neither authority had ordered it.

The *city* authorities had stationed a policeman in front of each infected house to prevent the ingress or egress of persons. At the time of this conference, however, the "Pest House" had been put in order and one patient had been removed to it. Although both the town and city authorities admitted the higher importance of protecting the public, yet it became very soon quite apparent that the real purpose of this conference was not to discuss the best methods of accomplishing that object, but rather to shift the care, responsibility and expense, each upon the other. The interview was spent in the discussion of the respective duties of the city and the town in this contingency,—in considering *who* should do rather than *what* should be done.

Upon being asked to express my views of the situation, I said: That as an officer of the State Board of Health, I possessed no authority to act farther than to advise. But inasmuch as the statute required that every case of small-pox occurring in the State should be immediately reported to me, I thought it carried the inference that it was my duty to keep informed of the condition and progress of all such outbreaks, and partly from that understanding and partly in compliance with an invitation from the *town* Health Officer, I was present.

I said: "I did not regard the differences of opinion which had been expressed on several points as of present importance—those questions could be settled afterwards. The urgent question now to be considered is, what shall be done to arrest the epidemic which has appeared in your midst, and which will spread further among your people if not prevented." I then quoted from the Charter of the City of Meriden as follows: "There shall be appointed annually from among the members of the Court of Common Council five persons who shall constitute the Health Committee of said City."

"The Health Committee may order any person found to be infected with any malignant, infectious or contagious disease into confinement in any place which they may designate, there to remain, until said committee shall order his release."

"The Health Committee may adopt such measures for the general vaccination of the citizens as they shall deem proper and necessary, and the expenses, so far as audited and allowed by said Committee, shall, after having been approved by the Finance Committee, and approved and ordered to be paid by the Court of Common Council, be paid from the City Treasury upon the order of the City Clerk."

I told them that the language of their Charter was so very clear and plain that it could not be understood as meaning anything else than giving the Health Committee of the City full authority to do whatever might be necessary to protect the public from this contagious disease. That it was clearly evident that the Committee was appointed for that very duty; and that if these small-pox cases were within the City limits it would seem that this Committee, and it only, had both authority and means provided to guard the public. The Health Committee of the City was endowed with power as the occasion demanded, to act promptly, effectively, and especially to resort without delay to that means of protection which was recognized throughout the civilized world as the surest safeguard against this disease, namely, vaccination. Their Charter itself practically commanded the Committee to do it by giving it full and unlimited authority to do this very thing, and draw upon the Treasury for the expense.

It was a most remarkable spectacle to see the officials of both governments wasting time in discussing the cost of providing for a few paupers in the face of such an alarming emergency. I

urged upon them the weighty importance of immediate vaccination of all persons who had been exposed or suspected of any exposure, and then the advantage of providing as speedily as possible for a general free vaccination of the whole town. I referred the City Committee to the small-pox circulars, which I had sent them, for full instructions regarding the isolation of patients and the disinfection of the houses, clothing, furniture, etc.

I particularly insisted that this business of disinfection was in large degree the work of an expert, or rather, that it was unquestionably the best way, to employ some intelligent, competent person to make it his special business to superintend the disinfection of the houses and whatever else may need it. That to depend upon the families doing it for themselves was utterly unreliable. I was asked by the chairman of the health committee if I would not advise the removal of all the sick to some place prepared for them outside the city limits.

I replied that my advice would depend upon circumstances. If, as in this instance, there were several cases in different families in a tenement house, I believed it would be better to use the house as a hospital and keep the patients in it. It was already fully infected, and the safety of the vicinity would not be improved by simply moving those now sick out of it. Keep them there until they have recovered, and also the new cases, which their long neglect of vaccination would lead me to expect, and then make a thorough, vigorous, and complete disinfection of the premises.

The meeting then resumed the discussion on the respective liability of the town and city for the support of the sick, and tried to appoint a committee of conference, but failed, and the meeting adjourned without definite action.

The City Health Committee then held a meeting and concluded to institute an immediate vaccination and adopt such other measures as were necessary.

I left them while considering these more appropriate topics.

Subsequent reports from the two health officers of the city and town state that up to February 28 there had been 13 cases, and 13 more during the month of March, of which at the end of the month of March there had been 10 deaths.

From a private letter from one of the Meriden physicians I learn that the first suspicious case reported to the City Board and

neglected, as chicken-pox, was the child M. C., aged 6 years. She, it is believed, contracted it from a boarder in the C. family who had an eruption which he knew to be varioloid from a known exposure elsewhere. When the girl's case was being investigated he had recovered, and was persuaded by the C. family to keep silent about it. He also played with a dog belonging in one of the houses in Veteran street, where other cases occurred. The contagion was probably carried in the hair of the dog.

The unjustifiable, even criminal, concealment of such a fact by the first victims of the disease cost ten lives, put many others in danger, and damaged the commercial interests of the city of Meriden to the amount of a good many thousands of dollars.

It will afford a notable illustration of the great importance of prompt notification to the health officer of every case of infectious disease, and that whenever there is a reasonable doubt of the diagnosis, the public should have the benefit of the doubt.

I have received no information from the health authorities of Meriden since April 1.

In no city or town in the State since the organization of the State Board of Health has there been so large a mortality from small-pox in any year as in Meriden during the months of February and March.

On the day of the conference of the two boards of health in Meriden one of the small-pox victims eluded the vigilance of the policeman stationed to watch the house he was in, and went to New Haven and returned in the evening, having escaped in like manner from the health authorities of New Haven, going each way on the passenger train. Another inmate of one of the infected houses was known at that time to have gone also on the train to New Haven.

In view of these facts, and fearing there might be a general diffusion of the disease throughout the State from this reckless exposure, the Secretary issued a cautionary circular to every local board of health in the State, urging them to be prepared to deal promptly and judiciously with any cases of small-pox that might occur within their respective jurisdictions.

It is but just to the health authorities of Meriden to say that when they did finally realize the responsibilities of their relations to the public, they were active and untiring to do whatever they could to arrest the progress of the disease, and that their efforts have been successful.

The following is the circular:

CONNECTICUT STATE BOARD OF HEALTH.

"FOREWARNED, FOREARMED."

NEW HAVEN, CONN., February 17, 1890.

To the Board of Health of----------

SIRS—The increasing prevalence of Small-Pox through the center of the State is a matter of general public concern. The roving disposition of such patients, which has not always been sufficiently controlled by health authorities, has added to the present danger of further contagion to an extent not yet capable of estimation. Twice, within a few days, has a patient on whom the eruption was well developed been permitted to travel in a passenger train on the railroad between Meriden and New Haven. Another inmate of an infected house has done the same.

With these facts existing, no community in the State can feel exempt from the liability to an outbreak of the disease at any time within the next two weeks.

In the opinion of the undersigned, the circumstances justify calling the attention of health boards in every town and city in the State to their present preparation for meeting such an emergency. Permit me, therefore, to ask the following suggestive questions:

Have you considered what effect even a few cases of small-pox would have on the business interests of your town?

Have you any provision for isolating a small-pox patient? Have you control of any building suitable for use as a hospital?

Is it ready for occupation? With needful furniture?

Have you considered under what circumstances a patient should remain in his own home, or be removed to an isolated building?

Have you a proper vehicle at command for his removal, in case you decide to do so?

Have you any trustworthy person engaged who has had the disease, and whom you could employ without delay, to serve as nurse?

Is the medical attendance provided for?

In short, are you fully prepared to act promptly, discreetly, and with quiet decision, both for the welfare of the small-pox patient and the protection of your fellow-citizens, if you should be immediately notified of the presence of a case in your town?

Are your people generally protected by vaccination?

Can you obtain promptly a good supply of vaccine virus if there should be occasion to use it?

Some forethought, and such preparation as may be made with slight expense, will enable you to act far more judiciously and successfully and at greater saving of expense than if surprised by the necessity of immediate action without timely warning,

Respectfully,

C. A. LINDSLEY, M.D.,

Secretary of State Board of Health.

Additional Water Supplies for Meriden.

The State Board promptly responded to a request from the city authorities of Meriden to come and examine certain sources of water supply available for that city, and advise them respecting the selection. After investigation the board made a report, as follows :

To His Honor Benjamin Page, *of Meriden.*

Sir—In compliance with your request, the State Board of Health has held two special meetings in Meriden, and has visited and investigated the relative merits of the several sources of a public water supply, which you pointed out to us. We have given them deliberate consideration, and respectfully present, with regard to them, the following report:

In the choice of a water supply three things must necessarily be taken into account—abundance, purity, and cost. Too often, in the past, the first and last essentials have been alone or chiefly considered with the result of a perpetual dissatisfaction on the part of the inhabitants, or at least with an added cost in the improvement of the water unforeseen in the projection of the supply. Meriden in the past has been fortunate.

No better supply than the one she now possesses seems practicable or even possible ; her water is better than that possessed by the most of large cities of the State. The city has come to expect good water, as was very plainly seen the past autumn by the very general dissatisfaction at what in many other places would have been received as a temporary inconvenience.

Aside from contamination from human sources, impure water in the most of our reservoirs is due either to flowage from meadow and peat lands, or from minute vegetable and animal growths. In the former case the water is apt to be discolored, with offensive taste and smell, and if allowed to stand soon becomes filled with microscopic growths. In the latter case an inordinate amount of such life is usually due to shallowness in the reservoir, permitting the bottom to be covered with rank growths of higher vegetation, which, aside from affecting the purity of the water in decaying, furnishes a nidus for the growth of independent organisms.

It is the general experience that a shallow reservoir furnishes either inferior water or water that is contaminated through a larger part of the year. By shallow reservoirs is meant reservoirs in which a considerable part of its area does not exceed ten feet in depth.

The essentials, then, for a good reservoir are : a minimum proportion of its area less than ten feet in depth; a rocky, sandy, or loamy bottom, and no peat or meadow lands in the water shed.

Black Pond will have an area of about 70 acres, largely of peaty bottom, with one half its area less than ten feet in depth, and a water shed of one square mile. The water of such a reservoir would undoubtedly

be filled with microscopic forms during six months or more in the year. Its bottom would be covered with water plants, and a perpetual expense would be entailed to keep it clean. The water would undoubtedly cause much dissatisfaction to its users. This source is not to be recommended.

The Compensating reservoir at Kensington would certainly be much better, if increased ten feet over its present depth. At present the water is largely filled with such plants and microscopic life as cause complaints at Middletown and New Britain. This reservoir would probably furnish a fair quality of water if the dam should be raised to increase the depth sufficiently.

The Crow Hollow reservoir would undoubtedly be better than either of the foregoing. It would have all the requisites for a good reservoir so far as it goes—considerable depth without peaty drainage or peaty bottom. Its water at present contains only a small amount of microscopic life.

The proposed site a mile north of the present one, if feasible, would possess the requisites for good water in the highest degree. It seems hardly possible that it could be excelled.

It would probably be almost entirely free from microscopic growths throughout the larger part if not the whole of the year; its great depth would hasten the purification of water drained into it, and its temperature would be materially less than that of the other reservoirs.

In case either the last reservoir or the compensating reservoir is used and the water pumped into the main or Merimere reservoir, so as to keep it full, it is certain that the water would be decidedly improved. One of the chief causes, probably, of poor water in the present reservoir during the fall months is the shallowness of the reservoir, permitting its temperature to be so increased as to promote the growth of vegetable or animal organisms.

Report on Sewage Pumping Station at Stamford.

I was called April 18th to Stamford by the local health officer to inspect the condition of the sewage pumping works. The following is the written report sent him :

New Haven, Conn., April 18th, 1890.

To whom it may concern :

I visited, by request, to-day the sewage pumping station at Stamford.

The purpose of the visit was to form an opinion about its influence upon the public health.

It is situated adjacent to the street. The receiving well into which the sewage of the town is discharged, is directly behind the engine house and only covered by a sort of board roof projecting from the walls of the building, and so constructed that it can be readily uncovered by opening the large trap doors in said roof. At the time of my visit the doors were open, and the conditions were practically the same as of an open cesspool of large dimensions.

During the winter season and possibly in cool weather the sewage of the borough reaches this pit before much advance in decomposition has taken place. But in hot weather when the processes of decomposition are rapid, the volatile effluvia generated from the sewage received in this open pit or well would escape into the atmosphere and from the very near proximity of dwellings on either side, it is impossible to believe that the rooms in those dwellings would not be invaded by this polluted air to the injury of the health of those living in them.

If, during the hot weather when the doors and windows of houses are open, the establishment is managed as it was when I saw it, I have no hesitation in expressing my opinion that it would be an unwholesome neighbor, on the general principle which is almost universally accepted, that pure air is healthy and impure air is unhealthy.

Respectfully submitted,

C. A. LINDSLEY, *Secretary.*

MANCHESTER SEWERAGE.

The following letter from a prominent citizen of Manchester will explain itself :

MANCHESTER, May 10, 1890.

Prof. C. A. LINDSLEY, M.D., 15 Elm Street, New Haven :

DEAR SIR :—I have been referred to you by Mr. A. E. Burr of Hartford.

The Board of Trade of Manchester, Conn., appointed sometime since a committee to report on sewerage. I enclose you a partial copy of their report, which will explain what we would inquire of you.

1st. Can you furnish us an expert who can advise us in regard to the probable pollution of the Hockanum river by the emptying of our sewage therein, and the possible danger, if any, to the mills below ?

2d. How soon can you do this?

3d. What would be the approximate expense, if any, to us in the matter? An early reply will greatly oblige.

Yours respectfully,

W. H. CHILDS, *Chairman Committee on Sewage.*

In compliance with above request, Prof. S. W. Williston, M. D., of Yale University, visited Manchester, and subsequently made the following report :

NEW HAVEN, June 5, 1890.

DR. C. A. LINDSLEY, *Secretary State Board of Health :*

DEAR SIR :—In accordance with your instructions, I visited Manchester, May 20, for the purpose of investigating the proposed sewer discharge of that village into the Hockanum river.

My previous studies of the pollution of this river as published in my report for 1887, page 255, and that for 1888, page 254, have made me somewhat familiar with the condition of the river and its main source

of pollution, and my attention while there was given to such additional sources of information bearing upon the sewage condition of the village as was possible to obtain.

The village of Manchester, situated a mile or two above the confluence of Hop Brook, is rather thinly built, and comprises about 1,800 in population. Some two years ago, a system of water supply was built, which, at the present time, furnishes about 10,000 gallons daily for house consumption, or perhaps for between 300 and 400 people. As is invariably the case, the water having been brought to the village, the next question to present itself is how to get rid of it. While the demand for sewers cannot be very urgent, yet there is no doubt but that sanitation, as well as public convenience, will be subserved by sewerage, and such is now contemplated and much desired by not a few of the people. The situation of the village is such that the proposed system of separate sewers can be built and maintained at moderate expense, provided that the natural drainage into the Hockanum river can be taken advantage of without detriment to their own and others' interests.

But, the village is largely dependent upon the manufactories, of which there are several important ones located here, whose existence might be endangered by any addition to the already great pollution of the water. The conformation of the land is such that the only practicable, if not possible, outlet is into the river just below the Keeney Brothers' paper mills, and perhaps a half-mile above the large and important mills of Peter Adams & Co., a firm engaged in the manufacture of the highest quality of papers, necessitating an abundance of pure water. Very prudently the village does not wish to add to the burdensome expense entailed upon this firm by the already existing pollution, and the advice of the State Board is asked upon the following points, which I give in the language of Mr. W. H. Childs, the secretary of the Water Company, at whose request the investigation is made:

1. Would the emptying of the crude sewage of the village of Manchester, numbering about 1,800 people, increase the pollution of the Hockanum to any material degree?

2. Would such pollution, if any, be of serious moment from a sanitary point of view?

3. Would the emptying of the sewage at the bridge below Messrs. Keeney Bros.' mill be likely to ever cause them or their employees any nuisance or trouble, or be likely to increase the probability of sickness among them?

4. Can you estimate approximately the present pollution of the Hockanum river?

5. What approximate percentage of increase in such pollution would be likely to be caused by the discharge of the sewage of Manchester therein?

6. Is it possible, in your judgment, for such increase of pollution to cause Messrs. P. Adams & Co., paper manufacturers, extra expense in the cleansing of the water for their use?

7. Would the emptying of the sewage of the Mather Electric Company's factory, employing about 150 hands, be likely to increase in any perceptible degree the pollution of the stream, and be likely to be of any damage to Messrs. P. Adams & Co.?

8. Is the pollution of the Hockanum river by the mills and city of Rockville likely to become a matter of serious concern to the manufacturing interests of Manchester?

9. What would you recommend in regard to the disposal of sewage matter by the village of Manchester?

10. In your judgment does Rockville need, or is it likely to need, in the immediate future, facilities for the disposal of its sewage?

I am somewhat indisposed to give positive answers to some of these questions, as such must depend on a more thorough knowledge of the commercial uses and necessities of pure water than I possess. I can, therefore, only give opinions based upon a considerable study of the polluted rivers of our State.

1. It is not very probable that more than 600 people would discharge their sewage into the stream for the first two or three years after the building of the sewers, and it is not probable that more than one-half the village would thus discharge their sewage while its population numbered less than 10,000. Its present sewage would increase the pollution only to a very moderate extent.

2. No. In itself the quantity would have an appreciable effect upon the riparian population; but, it must be remembered, that its effect upon a stream already approaching excessive pollution may be far different. If the water were pure there could be but slight sanitary objections to such disposal, provided that the water is strictly avoided for all domestic purposes; with the water already saturated—if I may use the expression—with pollution, its deleterious effects would be geometrically increased.

3. While the sewage is moderate in amount I do not anticipate that it would have an appreciable unsanitary effect upon the Keeney mill employees, though it would if the hundred or so feet distance could be increased.

4. Two years ago I estimated that there were sewering into the stream above Manchester about 2,500 people, with about two tons additional daily of solid organic putrescible waste, and as much more of inorganic waste. Since then, Rockville has, I believe, begun a system of sewerage, and additional mills have been put in operation, so that I think a low estimate of the entire pollution of the stream above Manchester would be an equivalent of the sewage of 6,000 people. Admitting that there is some destruction of this organic matter in a flow of four or five miles, and you would have certainly not less than an equivalent of the sewage of 5,000 people in the water at Manchester.

5. Estimating the sewage discharge of Manchester at 500 two or three years after the construction of the sewerage, the actual additional pollution over its present condition will not be much below ten per cent., if any.

6. As already stated, the Adams mills require an abundance of pure water in the manufacture of their goods. The water of the Hockanum, naturally of very great purity and well adapted for their business, has become so impure during late years that they have been compelled to use artificial means for purifying it, at an expense, I was told, of twenty or more thousand dollars. At present they use three Hyatt filters, which, although furnishing them excellent water, causes them an expense of over $1,500 per annum. The superintendent informed me that he has observed a steady increase in the contamination of the water; that whereas formerly it was only necessary to wash the filters once daily, he now had to wash them twice, and would soon be compelled to wash them three times. For all this Rockville is responsible. Whether or not the additional matter proposed to be turned in at Manchester will be of detriment to them, I cannot say; they themselves will be the best judges from the opinions already given.

7. The sewage of the Mather Electric Company's factory would not be equivalent to more than that of 100 people, and is not likely to increase to any marked extent. Its effect would necessarily be much less than that of the village, and as a temporary expedient I do not think the Adams Company would find cause for objections. This company (the Mather) at present make use of cesspools, but find them inconvenient and disagreeable, by reason of the impervious nature of the soil in the elevated region of the village where the factory is located.

8. It is my conviction that the commercial prosperity of Manchester is seriously endangered by the rapidly increasing pollution of the Hockanum caused by Rockville. Already Rockville has entailed upon one firm an expense of perhaps $2,000 a year by its pollution. This place would naturally be a center for paper manufacturer were the Hockanum an unpolluted stream. Is it likely that any new manufactories of the kind will locate there, knowing that the already bad water is steadily deteriorating? I may be entirely wrong, but it seems to me that in common justice Manchester and its manufactories could and should compel Rockville either to keep its impurities out of the water, or to pay the cost of its purification.

9. I do not feel competent to advise any method of sewage disposal for Manchester. This is the province of the sanitary engineer.

10. While it would be desirable to have a sewerage system in Manchester, yet its small size and comparative thinness of its population does not make such imperative. If the village does not feel that it can afford to experiment on other methods, I should advise that the project be held in abeyance until some other method than turning it into the river becomes both practicable and feasible. It should be borne in mind also, that, while Manchester now has just grounds for complaint against Rockville, such would be to a great extent nullified by any corporate action on her part tending to the pollution of the stream. I sincerely hope that the effects of river pollution on manufactories may soon receive judicial recognition. Otherwise the commercial prosperity of Connecticut will undoubtedly be impaired.

It may be of interest to add here a subsequent communication from Prof. Williston on the same subject. It was elicited by some comments made upon his report by a local paper.

Prof. Williston's Letter.

Editor of the Herald:

Through the kindness of a friend I have seen a copy of your paper of the 12th inst., containing my report on the proposed sewerage of Manchester, which you did me the honor to publish. In your editorial remarks you say that I had probably forgotten that South Manchester turns its sewage into the Hockanum. By no means had I forgotten the fact; my examinations of the foul stream flowing from that place are too vivid in my memory. If you are curious, you will find the following sentence in my report on rivers-pollution for 1888: "Hop Brook is contaminated from twenty-five to fifty per cent. beyond the greatest permissible [sanitary] limits."

Had my advice been asked I should have said that the sewage ought not to be allowed to go into the river. The Legislature may have done a wise act in giving a charter to the South Manchester Sanitary Company, but the fact is inevitable that some day it will have to rescind the statute and compel South Manchester to keep its sewage and manufactory refuse out of the water. My prophecy may be received with incredulity, but I can assure you it would not be, if every one could see, as I have seen, how rapidly the evils of river-contamination are growing. Manchester has probably not thought much about the Hockanum flowing by its door, but, when it once realizes the probability that it will become but little better than an open sewer in a few years, if Rockville continues to grow as it has within the past ten years, it will also realize the necessity of something being done. Connecticut is preëminently a manufacturing State and as such it requires pure, or at least clean water. Time and again I have heard complaints from manufacturing concerns that their business was being injured by the contamination of the water. Would it be just and right that Rockville should drive out the manufacturers of Manchester?

So far as the sewerage of Manchester is concerned I would advise patience. Your village is not the only one that is anxious on the subject. On sanitary grounds alone, the State Board of Health has uniformly advised against the permanent discharge of sewage into rivers. But one may wait a long time before the public will appreciate the argument from this point of view at its full value. When, however, pecuniary considerations make their appearance, action will be more prompt and decisive. I believe the subject, in a practical shape, will make its appearance before the next Legislature. At least, I hope that Manchester will add its share to the solution of the problem.

Respectfully,

S. W. Williston.

New Haven, July 16, 1890.

The Sewer System of Litchfield.

In response to a request by Hon. W. T. Marsh, Warden of the Borough of Litchfield, that the State Board would visit that place, inspect its sanitary condition, examine the plans proposed by their engineers for a system of sewering and give them the advantage of its advice on the subject, the majority of the Board visited Litchfield and were shown whatever pertained to the method of sewering proposed.

Another meeting of the Board was soon after held at New Haven, Sept. 22d, at which both Mr. McKenzie, of Southington, Conn., and Mr. Gray, of Providence, R. I., the Civil Engineers, were present and submitted the following written report:

Providence, September 23d, 1890.

To the Honorable Warden and Burgesses of the Town of Litchfield:

Gentlemen:—Having been requested to visit Litchfield, examine the Borough, and advise in regard to a system of proposed sewers, and in regard to the disposal of the sewage, I beg leave to report.

September 12th, I visited Litchfield for this purpose. I was met by your Engineer, Mr. T. H. McKenzie, who took me over the town, showing me the territory to be drained, pointing out the various possible points at which sewage might be discharged, either into the streams, or upon land for treatment. He also showed me such plans and profiles as he had prepared with reference to designing a sewerage system. Subsequently during the day, I again visited with members of the State Board of Health, portions of the ground over which I had been.

Having studied the question, I met the State Board of Health, and Mr. McKenzie at New Haven, September 22d; at this meeting the whole question was freely discussed.

The most thickly settled part of the Borough which it is desirable to drain at present, lies upon the hill or high ground, the general trend of which is southerly, sloping at the same time westerly and easterly. The slopes or grades, which it is easy to obtain for the sewers, are such that no special difficulties present themselves in regard to the best lines to adopt, except on account of the unusual width of the streets, being in some cases upwards of 240 feet, thus necessitating very long lines of drain to connect the estates with the sewer, if the sewers are laid in the center of the highways. In addition to this, the highways, particularly North Street and South Street, are upon the backbone of the ridge, the ground sloping each way from the street; consequently the rear of the dwellings or buildings to be connected, from which points in most cases it is desirable to start with the private connections, lie at various levels below the streets, in many cases over seven feet. It is well to have the sewers laid at such a depth as will allow of draining cellars or basements if desired. To accomplish this, owing to the sloping of the ground from the streets, the long lines of connecting drains with their proper grades, it will be necessary to lay the sewers

very deep if they are placed in the center of the streets. To obviate these deep sewers and at the same time give proper facilities for all needed drainage, it is suggested by Mr. McKenzie that the sewers be laid in the rear of the dwellings. This I believe to be a most economical and practical method of obviating the difficulties mentioned, provided, as I am informed is the case, proper rights of way can be obtained on reasonable terms. These rights of way should of course include the privilege of entering at all times upon the premises for making necessary repairs and for the maintenance of the system. These sewers may be located as will least interfere with existing improvements, and where they will best meet the requirements of those using them. Having the sewers thus located in the rear of the estates, the abutters will save much expense in making their connections with them, avoiding, as they will, long lines of deeply laid connecting drains.

From an examination of the territory and from the opinion universally expressed by the citizens with whom I met, I am convinced that no necessity exists at present for caring for surface water from the streets. I therefore fully concur in the opinion of your Engineer that the separate system of sewers is the best for your adoption, admitting, as he proposes to do, a limited amount of roof water.

The most important remaining question is the disposal of the sewage; upon the decision of this question depends to some extent the location of some lines of the intercepting sewers.

The question of the final disposal of the sewage is always an important one in the consideration of any sewerage system, but in your case it becomes an unusually important one. While in the past, the disposal of the sewage may have given no particular trouble, it must be constantly borne in mind that the introducing of a liberal supply of water as you are now doing, will vastly increase the amount of sewage, and may render what heretofore perhaps may have been only a slight trouble, a nuisance, and menace to the health of your citizens.

The universal high reputation which Litchfield has so justly merited in the past, as being a place of pure air, freedom from all nuisances to the sense of smell or the sight of the eye, and the perfect sanitary conditions existing in all its rural surroundings, renders it highly important that some existing evils in the thickly settled portions of the town be abated and that the sewage of the Borough be disposed of in a manner that will forever prevent its becoming a nuisance, or causing damage to any one. There is, in my opinion, no doubt but that the emptying of the crude sewage of the Borough into the neighboring streams will at least cause a nuisance to the sense of smell and to the sight, particularly during a low flow of the streams in the summer season.

The high reputation that dairy products of the town of Litchfield have always had, will not be enhanced, nor will prices received for these products be advanced, by emptying crude sewage into the streams, which, winding through the various farms, now furnish an abundance of pure drinking water for the many herds of cows, forming some of the finest dairies in the country.

To obviate these and other troubles which sewage will cause, some method of treatment becomes necessary. Among the most usual and practical methods of treatment may be mentioned irrigation, intermittent filtration through land, and chemical precipitation.

Without entering into all the details, and without dwelling upon all the subdivisions which each method is capable of, they may be described in the following general way:

Irrigation consists of applying crude sewage to the land in such quantities as will best serve the necessities of growing crops, and consequently purify the sewage. Intermittent filtration consists of applying all the sewage that the land can be made to properly purify, regardless of the effect upon growing crops. Chemical precipitation consists of mixing chemicals, often milk of lime, sulphate of alumina, etc., with the crude sewage causing the solids in suspension to be precipitated or thrown to the bottom in form of sludge, the clarified effluent being allowed to flow off into the streams, the sludge often being used for fertilizer.

While chemical precipitation does not as thoroughly purify the sewage as either of the other mentioned methods, still it is admissible as a method of treatment where a sufficient quantity of land is not to be had.

There is however in your case a sufficient quantity of suitable land reasonably near, but not too near the village for the practicing of irrigation, or intermittent filtration, either of which systems if properly carried out need cause no nuisance, or be offensive to the most fastidious. Of the two last mentioned systems of disposal, irrigation is I believe, the most desirable one for you to adopt. This method also promises greater returns in crops than does intermittent filtration.

The meadows just south of the "West Branch" so-called, furnish an ample area of suitable land at a proper elevation to be reached by gravity with the sewers, and at a suitable height above the stream bordering this area.

To deliver the sewage of the entire Borough on to this ground will necessitate, a sewer or lines of sewer in or along North Street, from a point about opposite the residence of H. W. Buell, Esq., down South Street to the meadow before mentioned. The sewage flowing West from the Western slope may be taken by an intercepting sewer as proposed by your engineer, and following at a proper grade along the Western slope, connecting with the sewer in South Street at a point about 75 feet North of the bridge in South Street over the West Branch thence in the South Street sewer to the irrigation fields. The sewage coming from the East slope which cannot be taken into the South Street sewer may be taken by an intercepting sewer as proposed by Mr. McKenzie along the Eastern slope and joining the South Street sewer at a point about 400 feet North of the bridge over the West Branch in South Street, thence through the South Street sewer to the irrigation fields.

This presents in general, omitting many minor but not unimportant details, a plan for the complete sewering of the entire Borough, and for

the disposing of the sewage in a manner which cannot in any way become a nuisance, in any degree, to any one, if proper regard to the details of design, thoroughness of construction and care in maintenance be observed.

To carry out this work as described it is estimated it will cost $44,900.00

This amount includes the cost of the main and intercepting sewers and appurtenances as described, the purchasing of 10 acres of land for sewage disposal by irrigation, the preparing of 5 acres for present use, leaving the balance to be prepared as may be required from time to time. It does not however include rights of way through private property, as it is believed this will not add materially to the cost.

This scheme provides for many years to come, and as far as the present consideration of the case is concerned for all time. As this requires a considerable sum of money with which to meet the present needs, I have been requested to so modify the plan as will reduce the cost, and at the same time present one which will be efficient for the present necessities, doing whatever is done in the line of permanency, and which eventually will result in a complete, comprehensive plan, requiring little or none of the work to be undone?

The bulk of the sewage will for many years doubtless come from the estates which can be reached by sewers in the line of North and South Streets. The sewage produced on the East and West slopes of the town can for some years to come be disposed of upon land lying upon either respective slope of the hills. This will avoid the necessity of building either the East or the West intercepting sewers for several years and thereby save much expense.

The sewage collection from North and South Streets may be taken to the irrigation fields South of the West Branch as before described. There is however other land known as "Sand Island" well adapted for the use of sewage disposal, and which lies at such a height that all the sewage from North Street and so much as comes from South Street North of a point opposite the house of George Thompson can be taken to this land. If there is not at present any crying necessity for sewerage in South Street, South of the house of Mr. George Thompson no inconvenience will be experienced at present, if this part of the sewer in South Street is not built. While Sand Island may not furnish sufficient quantity of land for future use and while it cannot be reached by the East and West interceptors as designed, it nevertheless has sufficient area for present needs of North and South Streets and probably for many years to come.

The using of this land will save about 3000 feet of sewer in South Street, but will require about 1800 feet of a smaller size sewer Easterly of South Street, to reach the land.

If Sand Island be used for the disposal of the sewage coming from North and South Streets at present, and if arrangements be made to dispose of sewage produced on the East and West slopes upon land

lying on these slopes, the costs of the work needed to be done at present may be reduced to $25,000.00.

This amount includes sewering North Street, from Dr. H. W. Buell's residence, and South Street, to George Thompson's. In West Street to a point a short distance West of the Court House and in East Street to the Torrington Road.

It also includes buying and preparing sufficient land on the East and on the West slopes for some years to come.

It includes purchasing five acres of land at Sand Island for present needs and an equal amount of land South of the West Branch for future needs. In this estimate is also included a sewer from South Street Easterly to Sand Island.

There are however no allowances made for cost of rights of way, it being understood as has been stated that the cost of these will add little or nothing to the expense.

It may be well to bear in mind that any land purchased for present or temporary needs for sewage disposal, can when no longer needed for such purpose be disposed of, at nearly if not its full cost, being as it will be in better condition than when purchased.

In view of what I have stated I reccommend that you adopt the separate system as proposed by your engineer, Mr. McKenzie, admitting a limited amount of roof water, and excluding ground water other than from cellars and basements as he intends to do. That you dispose of your sewage by irrigation. That for this purpose ten acres of land be purchased.

That the most comprehensive plan is the best there can be no doubt. It is a question however for your decision which you will adopt, as it is largely a financial one.

It is assumed that before entering upon the construction of any system of sewers, all details for the plans shall have been carefully studied and developed, and it is believed that the construction of a system of sewage will enable the Borough to take care of its increasing quantity of sewage which is sure to follow the introduction of water, in a manner which will entitle Litchfield to continue to stand one of the foremost towns as regards cleanliness, purity of air, and in all matters that go to make it a most desirable residential town.

I have been assisted in the consideration of this matter by the State Board of Health; and the views of this Board occupying as it justly does so important a position, and exerting so great an influence for good in all sanitary matters pertaining to the interests of the citizens of the various cities and towns in the State, should, I believe have great weight in deciding upon such questions.

I am also indebted to your engineer, Mr. McKenzie, for data furnished me and for much other valuable assistance in the study of this case.

Respectfully,

SAMUEL M. GRAY,

Civil Engineer.

The following Report was then prepared by the Secretary, approved by the Board, and ordered to be forwarded to the Burgesses of Litchfield.

Report of the State Board.

To the Hon. Board of Burgesses of Litchfield:

Sirs—Complying with your request that the members of the State Board of Health would visit your borough, inspect its sanitary needs, and consult with you and your civil engineers concerning the sewering of the village and the best method of disposal of the sewage, the majority of the members of the Board have been to Litchfield. They have examined the proposed plan of sewering, and considered the available methods of sewage disposal which your town offers. They have since consulted with Mr. McKenzie and Mr. Gray, your civil engineers, and have heard from them a full exposition of the different methods of disposal of sewage worthy of consideration in your place.

In the first place, the State Board desires to express its hearty and unqualified approval of your purpose to construct a system of sewers at once, upon the introduction of an abundant supply of water. You have wisely determined to anticipate and prevent the train of evils which an unlimited water supply would inevitably produce if no provision be made for the removal of the water as freely as it is received. It is far better to do this in advance than to wait until the consequences of neglect become unendurable and compel you to do it, or until some epidemic is developed, through soil pollution, which will directly and indirectly injure the welfare and best interests of the people of Litchfield to many times the cost of sewers.

Since the visit of the members of the State Board at Litchfield a conference has been held at New Haven with the sanitary engineers, Mr. Gray and Mr. McKenzie, at which they submitted to the Board, in sufficient detail, the general plan of sewering and sewage disposal which seemed best adapted to the conditions at Litchfield.

It is not necessary to describe it in full, as the written report of the engineers will also be given to you. The sewer construction is almost wholly an engineering question, and did not particularly engage the attention of the Board.

The final disposal of the sewage is by far the most important consideration.

The method that is proposed by the engineers is that known to sanitarians as the "irrigation" method. For this purpose a field called the "Hubbard meadow" offers exceptionally favorable conditions. These are, transmittal by gravity, ample acreage, and suitable soil.

In the opinion of the Board, the scientific preparation of the Hubbard meadow and the reception of the sewage upon it, under proper and well-known regulations, is the best practical mode of disposing of the Litchfield sewage, without creating any nuisance or producing effects detrimental to any public or private interests.

But the cost always constitutes an important consideration in the decision of most such questions.

The estimates given by the engineers to establish the above plant exceeded the sum of $40,000. This would not be a serious obstacle for a city of 40,000 inhabitants, but becomes a matter of no trifling gravity for a borough of less than 2,000.

If therefore the cost of the above system in its full development is beyond the ability of the borough, there is an alternative available at an estimated cost of about $20,000 less.

While the Hubbard meadow is apparently the only locality in the vicinity of Litchfield to which all its sewage can readily be conveyed, and which is preferable because the management and care of it would be in compact form and more easily directed; yet much can be saved in the construction of sewers by having separate irrigation fields located nearer the borough.

If therefore the demands of economy require it, the State Board would approve, as the second best method, the use of two irrigation fields suggested by your engineers—one known as Sand Island, containing about five acres, and another on the southwestern side of the borough, not very far from the rear of the Lake View House. The Sand Island would receive the greater part of the sewage of the borough, and was believed by your engineers to possess a soil even better than Hubbard's meadow for its purifying qualities. It is also quite remote from human habitations, and would not be objectionable on sentimental grounds if no other objections existed.

The field southwest of the borough will receive only so much of the sewage of West street and vicinity as cannot be carried by gravity to Sand Island.

The Board is informed that a present sewer discharges near this place, but that, by reason of lack of preparation of the ground and inattention to other necessary details of management, it is at times a very serious nuisance.

The State Board desires to impress the fact, which it is hoped will be constantly borne in mind, that it is the common experience of every and all systems of ground purification that the difference between success and failure, where the character of the soil and the physical conditions are right, depends upon the care and attention given to the proper distribution and management of the sewage when it is received upon the ground. The best conceived and most perfectly constructed sewage farms will become nuisances to the vicinity if their careful administration is neglected.

With proper care they are always satisfactorily successful; without such care they are always nuisances.

The State Board believes that the field at the southwest side of the town can, by proper preparation and due care, be made to dispose of the limited amount of sewage it will receive, without any offense.

In making the above recommendations the Board has given due consideration to other means of disposal, and are unanimous in the opinion that the plans which are advised above are unquestionably the best.

The most recent of reliable authorities on the subject of sewage disposal, after reviewing the various methods which have been tried in many places, writes as follows:

"In summarizing the foregoing conclusions and recommendations of the various commissions and committees who have investigated the subject of sewage disposal on different occasions, in this and other countries, during the past thirty years, it will be observed that perfect unanimity obtains in regard to the purification of sewage by means of land. Notwithstanding the fact that during that period the chemical treatment of sewage has received the concentrated attention of the most eminent chemists, it is still recognized that in order to produce a sewage effluent of any substantial degree of purity, land must be employed in some form or other."—*Sewage Disposal Works, by W. Santo Crimp.* 1890, p. 27.

The only other mode of disposal deserving of any consideration is by direct discharge of the sewage, without treatment, into "Bantam Brook."

This may commend itself to some of your citizens because of its cheapness. If Litchfield was located upon a shore washed by the tides of the ocean, such disposal of sewage into the water would be unobjectionable, because its immeasurable dilution and immediate dispersion by the action of the tides would render it harmless. But a very different result occurs upon adding the crude sewage of a borough of the population of yours to a small and sluggish stream. It would render the water turbid and unsightly, would destroy the fish in it, would probably at times so pollute the air above it with effluvia as to be offensive, and, what is in your case a very serious objection, it would make the brook water unfit to run through your pastures because of its unwholesomeness for your cattle.

The highest prosperity and best interests of Litchfield are so intimately associated with its long-established and well-deserved reputation as a sanitary resort, and also with the fame of its dairy products, that everything, and especially every public measure, which touches these interests should receive the most thoughtful regard.

We therefore, without any doubt or hesitation, advise that the method of sewage disposal by irrigation, after the plans designed by your engineers, is for the best interests of Litchfield.

Per order of the Board.

C. A. LINDSLEY, *Secretary.*

New Haven, September 22, 1890.

The following letter and report relates to the action of the Board concerning a proposed

Sewerage System for Bristol.

Meriden, Conn., October 1, 1890.

Prof. C. A. Lindsley, Secretary.

Dear Sir—Can you and some other members of the State Board of Health go to Bristol and look over plans for the disposal of the sewage of the town? A committee was appointed by the town to investigate and report on the best method of disposing of the sewage of the town (other than emptying into the stream), and the probable cost of such a system.

The committee will meet next week, Wednesday evening, and expect a report from me, in order that they could report to the town meeting Saturday of next week (11th Oct.). Please invite any or all members of the Board to visit Bristol on or before the 11th, and approve or disapprove of the plans of disposal.

Please notify me at Southington; also F. G. Hayward, Chairman of Sewer Committee, Bristol, Conn., of the date and time of your meeting there, and oblige,

Yours truly,
T. H. McKenzie, *Civil Engineer.*

Report of the State Board.

New Haven, Conn., Oct. 6, 1890.

To the Sewer Committee of the town of Bristol:

Sirs:—Complying with your request the State Board of Health convened on Saturday, October 4th, at the Bristol depot, to consult with you and your engineer, in regard to the most sanitary way of disposing of the sewage of your village.

The Board, escorted by yourselves, were shown the present methods of disposal and visited the grounds to which it was intended to carry the sewage. The Board also heard in outline from Mr. McKenzie, your engineer, the proposed method of disposal, and he has since submitted in writing more in detail the plan he has designed.

The Board were strongly impressed with the urgent need of reform in the existing methods of disposal of sewage in Bristol by cesspools and the inevitable consequence of dangerous contamination of the soil, or by the only less objectionable practice, of discharging it without treatment into the Pequabuck river. Either of these methods are cumulative in their effects and will eventually become intolerable to an enlightened community.

The plan which Mr. McKenzie proposes is not at all novel, or of the nature of an experiment. The principles involved in it are the results of the experience of many towns and cities in other countries, during the last thirty years, and have been tested in practice, with satisfaction, in a few places in this country.

The chief question which falls legitimately within the function of the State Board of Health to consider is, the treatment of sewage in such manner, that it shall not become a breeder or carrier of infection.

It is the concurrent opinion of all competent observers, that crude sewage received into deep vaults in the ground, or conducted into small streams, is a very unsanitary and objectionable mode of disposal. It is also the unanimous testimony of all the various committees and commissioners, which, under the direction of different governments have given the subject scientific and careful investigation, that the collected sewage of communities, is an agent of such evil influence, that except where it can be discharged directly into the ocean or other very large body of water, public safety demands that it shall be purified by treatment.

They are equally unanimous in the opinion that purification by means of land is the best system now known.

Of the various methods of purification by land, there can be no hesitation in choosing that known as the "*irrigation method*" in all cases where towns are as fortunate as your town is, in having land available within easy access, abundant in extent, low in cost, and admirably adapted in quality for the purpose.

The State Board of Health unanimously concur with Mr. McKenzie, your engineer, in the selection of the site for the disposal of your sewage and in the methods which he has advised.

The above is respectfully submitted, per order of the Board.

C. A. LINDSLEY, *Secretary.*

About the middle of October Sam'l M. Gray, C.E., City Engineer of Providence, extended an invitation to the Connecticut State Board of Health and to some other gentlemen, including the Warden of Litchfield, to visit Cranston, R. I., and inspect the system of sewage disposal by land irrigation in use there.

The invitation was accepted by a number of the members and others, and on the 14th of October we proceeded to Providence, and, after examining the works at Cranston, extended our trip to South Framingham, Mass., where we were cordially received by the officials of that place and given every facility for a full examination of the works in operation there.

The report of our visit to those places was subsequently written to the borough of Litchfield by Warden W. T. Marsh, and with his consent is herewith published.

DISPOSAL OF SEWAGE—THE IRRIGATION PLAN.

REPORT OF WARDEN MARSH.

Last week the State Board of Health, the Wardens of one or two boroughs, including the writer, visited Cranston, R. I., and South Framingham, Mass., for the purpose of inspecting the sewerage systems in

operation at those places, and to ascertain any facts that might be of benefit to the several towns which are desiring some suitable plan for taking care of their sewage.

The first place visited was Cranston, which is a charming suburb of Providence, about eight miles out. Several State institutions are located there—the Prison, Insane Asylum, House of Correction, the Asylum for State Paupers, etc.—the five stone buildings of which are all located near each other on a little ridge of land just west of the village. The system of sewerage at this place was constructed by the State. It provides for the several institutions mentioned, and at present is taking care of the sewage of 1,100 people.

A field of 3½ acres, nearly level, was prepared by thoroughly underdraining with four-inch drain tile, by building a low embankment around the ends and lower side, and by digging a shallow ditch along the upper side. The sewage is brought down to the field, a distance of about 1,000 feet, through a six-inch Akron pipe, to a point about the center of the ditch, which is divided into sections so that the flow of sewage can be turned upon any part of the field or shut off at any time by means of gates at the end of each section. From the main ditch the sewage flows out through small channels cut along the top about eight or ten inches apart, so that no great amount flows on at any one point.

The field was plowed about a year ago, and seeded with "Italian rye grass," a species of tall, rank-growing water grass similar to that seen about the margins of shallow lakes and streams. Since that time nothing has been done except to cut the grass when necessary and attend to the changing of the flow of the sewage. They have also another field of about four acres, the two being divided by the railroad track. The sewage can be conducted to the center of this field by a siphon pipe under the track.

This field was prepared more especially for raising crops on the plan of making the whole field as level as possible, and then throwing the soil up into narrow beds about four feet broad and ten or fifteen feet long, with shallow ditches between, so that, when turned on, the sewage would flow over the entire field and surround the beds, upon the top of which various crops had been planted. Some of these had made a sickly kind of a growth, and more had failed to grow at all. The Superintendent told me that they made no account of the crops, but that the preparation of the ground and care of them served to keep busy some of the unfortunates under his care, and improved the appearance of an otherwise barren and unsightly place.

Of course no estimate of the cost of anything could be had, as all the labor was done by the inmates of the different institutions, no outside labor of any kind being employed except one mason for a short time.

So far as taking care of the sewage is concerned, it seems to be a complete success in every way. One end of the first-mentioned field adjoins the highway leading to the railroad station. A fine concrete walk is laid along the side next the field, with nothing but a light open fence between, and there is nothing that is offensive either to sight or smell, nor is it at any time a nuisance in any way.

At South Framingham the works are more extensive and complete. The sewage at this place is taken by gravity to a point about a mile from the village and then, by means of pumps, forced to a field about three miles further out. There the town purchased about seventy acres of cheap land, and they are gradually clearing it of trees, etc., and fitting it for the purpose of taking care of their sewage. No attempt has been made to produce anything in the way of crops, their only idea being to get rid of the sewage in the best manner.

About 3,000 people are at present connected with the sewer, and for a year past it has all been taken care of on about five acres, and the engineer claims that this tract will take care of it for five or six years to come. It is managed in much the same way as at Cranston, except that the ground has not as yet been plowed. In the estimate of the number connected is included several factories, one large rubber factory employing about 1,000 hands, and an interesting point to note is the amount of sewage produced. This is shown by the pumps to be from 100,000 to 140,000 gallons per day, the average being about 130,000. The main pipe from the pumping station is only 12-inch, and it is expected that when the system is complete about 6,000 people will be connected, and that the 12-inch pipe will carry it all.

In view of the facts, it would seem to be a comparatively easy and inexpensive matter to take care of our borough, as we have but a small amount of sewage to dispose of, and heavy grades, enabling us to use small-sized pipe with safety, and also rendering it unnecessary to make deep cuts to obtain an even grade; and, finally, the sewage can be disposed of at some point near by, without becoming a nuisance to any one.

WM. T. MARSH.

Litchfield, October 30, 1890.

The following correspondence is published because it relates to questions respecting which the Secretary is often required to give information.

———, MAY 10, 1890.

DR. LINDSLEY:

Dear Sir:—There are two bodies in a tomb in one of our cemeteries here; were brought here from Boston four months ago; the family they belong to are coming here to live; they want to take these bodies from the tomb and bury them in the cemetery and have a funeral on Monday, June 2; their reason is that they have relatives that cannot get here until that day. I told the undertaker that the statutes did not allow me to give a permit to take a body up after May 31 until Oct. 1st. He thinks by being in a tomb it might be allowed, so I write to you for information. They are nice people "the family" and have a good many relatives here.

I will trouble you in one more case in a disinterment of a body. The statutes say, that husband or wife, and near relatives must give consent before the body can be taken up. Does that include step-children?

That is, a man's second wife dies and is buried, he is dead also. Can his children by his first wife stop the removal of the second wife (if all her relatives give their consent) by their objecting to the removal.

If you will be so kind as to give me your opinion of these two cases as soon as convenient I will be greatly obliged.

Yours Respectfully,

—— ——, *Registrar.*

NEW HAVEN, CONN., May 12th, 1890.

—— ——, *Registrar of* ——,

Dear Sir:—I suppose that by a "tomb" you mean a receiving vault, and that in fact, there has not as yet, been any burial proper. If that is the condition, and if the bodies did not die of any infectious diseases, and the coffins are not to be opened, I do not think what is proposed to be done amounts to a "disinterment." But to save yourself from criticism I would suggest that you get the consent of your health officer.

Regarding your other case, I can only say that the State Board is not authorized to interpret the law where questions occur, which only courts can decide. The disinterment of near relatives present so many phases and has so often been the subject of legal investigation that the State Board has no opinion to offer on the present case.

Very Respectfully,

C. A. LINDSLEY, *Secretary.*

——, CONN., May 13th, 1890.

DR. C. A. LINDSLEY:

Dear Sir:—I write to you as the Secretary of the State Board of Health for advice. A cesspool is being built nearly in the center of our public green, to receive the drainage from a private house. I understand it is to be cemented and covered. The neighbors are afraid it may be a nuisance and are about to petition the Board of Selectmen and Board of Health to have the party digging it restrained from completing it. In your opinion, can it be called (from the sanitary point of view), at least at present, a nuisance? Can the Board of Health restrain it as a prospective nuisance?

Your advice will be highly appreciated by yours sincerely,

—— ——,

President Board of Health.

NEW HAVEN CONN., May 13th, 1890.

—— ——, *President Board of Health of* ——,

Dear Sir:—Replying to your enquiry of the 13th inst. would say: I do not think the question of the power of local boards of health to act upon perspective nuisances and prohibit them has ever been settled in the courts. The laws on the Statute books seem to apply only to existing nuisances. On the other hand the administration of public hygiene is so much more effective as a preventive agency that it is often called "*preventive medicine.*"

That a cesspool, such as you describe, will become a nuisance, unless cared for constantly with the most scrupulous attention is not to be doubted.

As soon as it is such your board can act without any question.

Your situation presents a good illustration of the value of a code of sanitary regulations for your town.

As a board you have power to enact such; therefore if one existed prohibiting the construction of cesspools except with the approval of the Board of Health you would have control of such matters.

As it is now, the cesspool cannot be declared a nuisance and in the absence of any local prohibitory regulation, I suppose you must wait until it becomes one, before you can order it abated.

Very Respectfully,
C. A. LINDSLEY, *Secretary.*

The following Report to the Town Board of Health of Norwalk by Dr. Bridges is not only an important one in itself as indicating a certain form of danger to the public health of which the public have but little appreciation, but it is also important as showing the urgent need of some amendment of the present legislation, looking to the control of this source of danger.

NORWALK, April 19th, 1890.

To Town Board of Health, Norwalk:

GENTLEMEN:—On March 23d last, I was called to see a herd of cattle consisting of forty-eight cows, nearly all of which were milking (and supplying this vicinity with milk for food), and four bulls and six oxen. These animals were on a large dairy farm at Wilton (this State) known as the Castle Coote Farm, formerly belonging to the late Thomas Gunning. Quite a number of the cows kept on that place for the past two or three years had died, and at the time I was called in several were sick and some fifteen or eighteen were reported to have died in the past few weeks.

These cattle had formerly been quarantined at Mount Vernon, suspected of contact with the contagious disease, known as Pleuro-pneumonia, which prevailed in that locality to an alarming extent; shortly afterwards being released they were removed to Wilton, and there again quarantined by our Commissioners of Disease of Domestic Animals, and after a suitable time were released. Taking the previous history of the herd, together with the locality they came from, I advised the assignee (Dr. C. B. Coolidge) to notify the State authorities at once. This was done, and Chairman E. H. Hyde, in company with Drs. C. B. Michener and (of Governor's staff) Hickman, arrived at the farm March 28th and slaughtered three cows, all of which were found to be affected with Tuberculosis in an advanced stage. Owing to the fact that Tuberculosis has never been considered a contagious disease by our lawmakers, the *Commissioners of Disease were powerless to act*, consequently nothing was done to protect either consumers of milk or

owners of cattle throughout the community. All of this stock was advertised to be sold at auction April 3d, and Dr. Coolidge, the assignee, and others interested were too honorable to sell diseased cattle and not inform the buyers, so I was requested to call in Dr. J. E. Gardner of Hartford, and with him make an examination of the whole herd and take out all of the diseased animals we could find, which we proceeded to do the next day, March 29th. After carefully going over the herd we found ten that were diseased (affected with Tuberculosis). The balance might have either the abdominal form or glandular form and some time later on, develop the disease perceptably, but as far as we were able to determine, the rest to all appearances, were healthy.

After this, at the auction April 3d, they were all sold, Dr. Coolidge announcing before the sale all the facts and whoever bought them would do so at their own risk.

The ten herd we condemned were bought by a country butcher, who although he was aware they were more or less affected with disease, paid $10 per head, and I am told is milking a few of them and selling the milk.

Feeling that you gentlemen which compose the Board of Health of the Town of Norwalk are deeply interested in the welfare of the public health, I deemed it my duty to inform you of this deplorable state of affairs, thinking that by the aid of our State Board of Health you might bring influence to bear which would be the means of perhaps getting some law passed that the public health may have some protection against the propagation of this fearful disease—consumption, from animal to the human family.

In the last two reports of the Commissioners of Disease of Domestic Animals, they claimed Tuberculosis to be increasing to an alarming extent all over the State, but no suggestions were made to remedy it. They intimated that possibly some human beings were sacrificed through either the milk, food or beef of such diseased animals.

Another disease which I would call your attention to which has caused sad havoc among our equine species in this town for the past six or eight months, and which if not stamped out will endanger human life. That disease is Glanders and Farcy. Here again our Commissioners of Diseases can not, or do not, or will not act, owing to some unpleasantness which occurred several years ago, in which the State was very much to blame in not backing up the Commissioners, consequently they went before the Legislature and asked to be released from acting on Glanders and Farcy. Since then the people have had to depend on a mere handful of veterinary surgeons, scattered throughout the State, which together with the aid of the Humane Society of the State, the disease has not had a chance to spread as fast as it otherwise would, but for all this there is far too much of it in this State, and if proper measures were adopted there is no reason why it should not be stamped out.

Trusting you will give this due consideration, I am,

Your humble servant,

GEORGE BRIDGES, *D. V. S.*

Communication from the Connecticut State Veterinary Medical Association.

The Veterinary Association having had its attention directed to the report of Dr. Bridges, and being acquainted with the facts stated in the report, after consideration of the subject appointed a committee to consider what is necessary to be done to extinguish or restrict the contagious and infectious diseases of our domestic animals.

The committee have transmitted the following paper to the State Board of Health, and request its publication in the Annual Report of the Board.

The Infectious Diseases of Domestic Animals.

How do they stand related to the public health?

It is a fortunate fact that mankind is not subject to all the diseases which afflict the lower animals.

But there is another curious fact, indicating that mankind sets a higher value upon money than upon the lives of his fellow creatures. Those diseases of the lower animals which are most destructive to them and so involve a large pecuniary loss command more readily the attention of our law makers and secure more direct and effective legislation than diseases which are only or chiefly dangerous to human life. It has been sarcastically said that the United States has paid more money in the investigation of the diseases of the hog, than it has for all the diseases of the human family.

But there are some diseases which are common both to man and animals.

The most recent and well established teachings of medical science assert, that Tuberculosis is a disease to which man and several of the domestic animals are equally susceptible; and that this disease is transmitted each to the other. It is also established that the disease is caused by a special infection, existing and reproductive in diseased subjects and that mankind is liable to receive such infection by eating the flesh or drinking the milk of tuberculous animals.

There are no articles of human food in more common and constant use than beef and milk. There is no disease so destructive to human life in Connecticut as Tuberculosis. In this connection the report of Dr. Bridges lately made to the Board of Health of Norwalk and to be published in the Annual Report of the State Board of Health should be taken as a note of warning. That

report, together with much other information equally reliable and well known to the undersigned, are satisfactory proofs that Tuberculosis prevails to an alarming extent among the cattle of Connecticut.

Let us give to these facts their full significance. Keep in mind that Consumption is the most fatal of human diseases. That it is due to an infection. That Consumption is prevalent among our domestic cows. That the flesh and the milk of consumptive cows can communicate the disease to those who partake of them.

Does not the logic of these facts suggest the startling and alarming thought that in all reasonable probability human victims to this dreadful malady are constantly being made by the heedless use of beef and milk from diseased cows!

When the astounding fact is announced that a herd of cows known to have tuberculous disease, is openly sold at public auction to butchers and dairymen, to be used in their business, their diseased condition being declared at the sale, as a qualifying circumstance affecting their value, is it not quite time that something should be done which would effectually prevent a repetition of such a monstrous act.

The legislation of Connecticut must be sadly defective if "the Commissioners on Diseases of Domestic Animals were powerless to" arrest so dangerous a proceeding. On the statute books of Connecticut there are imposed penalties of fines and imprisonment for "administering any poison or noxious substance to any horse, ass, mule, or neat cattle," yet the sale of beef and milk for human food known to contain a deadly poison cannot by the laws of Connecticut be prevented. Says Dr. Bridges, "the Commissioners of Disease were powerless to act."

There are other diseases, of most dangerous nature, common to both man and animals, respecting which there should be more protective legislation than there is at present.

Among them is Glanders or Farcy. This is a contagious and incurable disease of the horse. It is equally incurable in the human subject. Through the inscrutable wisdom of a former legislature the Commissioners on Diseases of Domestic Animals were relieved from any responsibility regarding the spread of this dangerous disorder. And the inefficient and sloppy laws aiming to control it now in force are practically inert and useless. Under their operation this fatal disease is increasing in Connecticut. It is of interest to every man who owns a horse that this disease should be restricted to the minimum. It is of interest to

every citizen of Connecticut that he should not be exposed to the personal danger of its contagion.

The only precaution which our laws now provide is that the owner of a glandered horse shall not sell, use or expose it. That is the only safeguard against this contagious and incurable malady which our laws afford. What is an exposure in a legal sense? The laws do not answer. But science declares that every pasture field in which such a horse may graze, makes that field a focus of contagion to other horses for weeks, possibly months, after. Every hitching post to which such a diseased horse may have been tied, every manger in which he has been fed, every water trough from which he may have drank, may retain the contagion to infect other horses for an indefinite time. In fact it is almost impossible to keep a glandered horse so isolated as not to be a source of contagion to others, both man and beast. In the last "Special Report on Diseases of the Horse," issued by the U. S. Dept. of Agriculture, 1890, it is stated on page 518, that cases of Glanders have been known to be caused by feeding animals in the box or stall in which glandered animals had stood more than a year before.

There is only one practical way of safety, only one possible method of extinguishing these diseases. That is by destroying the diseased animals without delay after they are known to be diseased. Both Tuberculosis and Glanders are infectious and hopelessly incurable. And all animals afflicted are a menace to the health of man and beast so long as they are permitted to live.

"In all civilized countries, with the exception of some of the States in the United States, the laws are most stringent regarding the prompt declaration on the part of the owner and attending veterinarian at the first suspicion of a case of Glanders, and they allow a liberal indemnity for the animal. When this is done, in all cases the animal is destroyed, and the articles with which it has been in contact are thoroughly disinfected." Special Report on Diseases of the Horse, U. S. Dept. of Agriculture, 1890, page 526.

All the laws now on the statute books of Connecticut pertaining to this important matter—the infectious diseases of the domestic animals—need a revision and codification. They should be made practical and effective, and then some one board of commissioners should be authorized to enforce them and made responsible for their execution.

DR. EDWARD C. ROSS, *Chairman.*
DR. H. E. BATES.
DR. HARRISON WHITNEY.
} *Committee.*

ORIGINAL PAPERS

ON

MISCELLANEOUS SUBJECTS

The following papers on Sanitary topics have been contributed by their authors and accepted by the Board.

The authors of said papers, and not the Board, are responsible for the opinions expressed therein.

REPORT ON THE CAUSE

OF THE

RECENT OUTBREAK OF TYPHOID FEVER IN WATERBURY.

Made to the Connecticut State Board of Health,

By HERBERT E. SMITH, M.D.

On the twenty-fifth of June, 1890, Dr. Lindsley, the Secretary of the State Board of Health, received a communication from Dr. Frost, Health Officer of Waterbury, informing him of an outbreak of typhoid fever in that city, and requesting the assistance of the State Board in ascertaining the cause. Dr. Lindsley requested me to undertake an investigation, and on the following day I accompanied him and Dr. Goodwin, another member of the State Board, to Waterbury to begin the inquiry.

We were informed that of the cases then known, a considerable number had occurred in houses supplied with milk from one dealer, who drew a considerable part of his supply from a dairy farm on which there had been three cases of typhoid fever. Immediately on learning this, on June 23d, the Health Officer had stopped the sale of the milk of this dealer, and had been not a little criticised for so doing. Because of the suddenness of this outbreak, and its apparent connection with a special milk supply, it was decided to make a thorough investigation.

Waterbury is a city of about 33,000 inhabitants, situated in the Naugatuck Valley, at the junction of the Naugatuck and a small stream, Mad River. The city is mostly on the east side of the Naugatuck, but extends also somewhat to the west of it, and to the south of Mad River. The soil of Waterbury is sand, gravel

and light loam, which is generally deep, but in some places the underlying granite and schistose rocks come nearly or quite to the surface. The surface rises rapidly from the river to the hills on the east and west. A portion of the city about the public green was formerly swampy, and has been filled in, but generally there is good surface drainage and a deep and dry subsoil.

Sewage Disposal.

The rapid growth of the city has led to the erection of many houses in unsewered districts; and although sewer construction has been pushed rapidly during the last few years, and the sewer system is now quite complete except in the outlying districts, there are many houses without sewer connections. Mr. Whitlock, the acting engineer, to whom I am indebted for many courtesies, estimates that about one-half the inhabitants use the sewers. The sewers are so arranged that they discharge into the Naugatuck River between Bank Street and Mad River, at points unfortunately too far within the city limits. It is thus seen that the sewage of about half the people is emptied into the Naugatuck in the southern part of the city, and the rest is disposed of in vaults and cesspools.

Water Supply.

Water is supplied from the city water works, chiefly from two collecting and one distributing reservoir situated about three miles to the southeast of the city. But in the northern part of the town is another, the Cooke Street reservoir, fed in part by springs and from a small collecting area, but chiefly from the East Mountain reservoirs. The Cooke Street reservoir supplies the houses on the hill near it, but is held chiefly as a reserve supply. Wells are to be found in considerable numbers, and are still used.

The Fever Cases.

The data concerning the cases of typhoid fever were mainly obtained from the physicians of the city, to whom my thanks are due for their uniform courtesy. Whenever it seemed desirable, the data thus obtained were supplemented by visits to the infected houses. Because of the nature of this disease, exact dates cannot be assigned to the time of invasion in each case; in some cases the date given is the time when the physician was first called, in others it is the time when the patient was first confined to bed.

According to the death records of the Town Registrar, there were five deaths from typhoid fever during the first five months of the year; during June there were six; and also six during July up to the 25th. The total number of cases during these months I have no means of ascertaining; but as there was a sudden outbreak of cases during June, I confined my attention to them. There were reported as occurring during June, fifty new cases in thirty-five houses, the first case on the 8th and the last on the 30th. They were distributed as follows:

Date in June,	8th–10th.	11th–15th.	16th–20th.	21st–25th.	26th–30th.
No. of Cases,	3	16	10	11	10
House Invasions,	3	10	7	9	6

There were a few cases, perhaps six, that came to my notice as occurring during July. They were not investigated, and there were probably very few more than these. There was, therefore, a sudden outbreak of cases in the last two-thirds of June, the majority, or twenty-eight cases in nineteen houses, being in the middle third.

Of the ten houses in which there were more than one case, the dates assigned were as follows: house (*a*), cases ill on June 16th and 22d; (*b*), 15th, 20th and 22d; (*c*), 12th and 15th; (*d*), 19th 20th; (*e*), 8th, 11th and 14th; (*f*), 10th and 12th, (*g*), 12th, 15th and 28th; (*h*), 11th and 15th; (*i*), 22d, 28th and 28th; (*j*), 25th and 29th.

These dâtes cannot be accepted as exact, as already stated; but they surely indicate that few of these cases are to be regarded as secondary, receiving the contagium from a first case in the same house, since in but one case is the interval as great as the usually accepted period of incubation, ten to fourteen days. In that case the time from the first to the last case is sixteen days. The evidence rather is that the method of infection was such that the contagium was received on or about the same time, the fever developing synchronously in diverse parts of the city in several instances.

In location, five cases were somewhat beyond the southwestern limits of the city; the others were distributed through the four wards, with rather more in the second and third than in the first and fourth. In one street, South Willow, there were eleven cases in six adjoining houses, one house being vacant. In five instances there were cases in two or three houses on the same street, but these streets were not close together.

It is significant of some far reaching method of infection that there should be such a considerable number of cases suddenly developed in the month of June, in which month this fever is much less common in this region than in the early fall. The history of the spread of typhoid fever is such, that for the explanation of an outbreak of this kind, one is led first to investigate the sewer connections between infected localities, the water supply and the milk supply. In following up these suggestions, it was found that of the total number of house invasions eleven were on unsewered streets and twenty-four were on sewered streets; the house connections in each case were not ascertained. The development of cases in the two classes were simultaneous in several instances. On the street before referred to, in which there were five invasions in six houses, it was ascertained that there were two sewers, an old and a new one, which joined one another about a block below these houses. Three of the houses were connected with the new and two with the old sewer.

On account of the intersection of the city by the Naugatuck River, there are distinct systems of sewers in the separated portions. The eastern and much the larger portion of the city contained the larger number of infected houses, but there were seven on the other side. These facts do not support the view of the dissemination of the contagium by means of sewers.

With regard to the water supply, there were three or possibly four cases in the limited area supplied by the Cooke Street reservoir. The wide distribution of the other cases excludes the view that the water pipes in the city had received the contagium from contaminated soil by reason of leaks, as has been found to be the case in some epidemics, unless, indeed, the contamination had occurred in the chief main or at the reservoirs; and as no cases were known so situated as to have caused such contamination, this view could not be entertained. The character and surroundings of the East Mountain reservoirs are familiar to me, on account of this supply having been one of those regularly examined during the last year by order of the Board of Health. The following are the results of analyses of the reservoir water taken at dates just before and during this outbreak, and copied from the records of the State Board on the work done under their direction on the pollution of rivers. When compared with the normal waters of this section, they show no evidence of animal contamination.

	May 21.	June 20.		
Residue on Evaporation,				
Total	30.5	30.	parts per million.	
Volatile	8.0	10.	"	"
Chlorine, combined	2.25	2.13	"	"
Nitrogen of Free Ammonia	0.024	0.046	"	"
Nitrogen of Albuminoid Ammonia	0.176	0.172	"	"
Nitrogen of Nitrates	0.03	0.00	"	"
Nitrogen of Nitrites	0.	0.	"	"
Number of Bacteria, average of five samples	331.	420.	per cubic centimeter.	

Milk Supply.

Concerning the milk supply, the following facts were learned. Of the thirty-five house invasions with fifty cases, twenty-six houses with forty-one cases were identified by a certain milk dealer as houses occupied by families which he had supplied with milk at or just before the time of the outbreak. This number includes all houses in which more cases than one were reported; also the South Willow Street houses, and all others in which cases occurred in houses adjoining one another or very near together.

Of the remaining nine houses, containing nine cases, one, No. 24, will be mentioned in another connection (see page 9). Another, No. 31, was taken ill on June 21st, in an unsewered house, no case in the vicinity, and no cause could be given by the relatives. Had drunk much milk, which was supplied to the family by two milkmen, one of whom had *obtained milk regularly from the dealer mentioned above.* No. 22 was taken ill on June 14th, two weeks after eating a little ice cream made from cream *furnished by the same dealer.* The dealer was quite certain that the cream used could not have come from an infected source, and the case may be a doubtful one, but no other source of infection could be found. In this connection it may be mentioned that, as shown by the work of Prudden and others, typhoid bacilli may retain their vitality a long time when frozen. Of the six cases remaining, one, No. 50, was reported late, and has not been investigated; of the other five, none had had any of the milk of this route. No. 33 was a youth, ill on June 19th, in an unsewered house four numbers distant, on the same side of the street, from a house in which the Registrar reported a death from typhoid fever on May 20th, and within about a block of a house in which another death had occurred on January 28th. No. 17 was a boy, living in the south part of the city, ill on June 14th;

no cause could be ascertained, except that he had been swimming in the Naugatuck. As above stated, a part of the sewage is emptied into the Naugatuck at Bank Street, and as there was fever in the city during the last of May, it is possible that the case originated in this way. No. 32 was a woman, ill June 21st, in a sewered house, no other case in house or neighborhood. No. 43 was a man, ill June 27th, in a sewered house ; two other cases on the same street some distance away ; had used spring water which was believed to be pure. No. 45 was a woman, ill June 28th, in an unsewered house, no other cases in the immediate neighborhood ; milk came from a single cow, at a place of which it was reported that there had been a case several months ago ; this was not further investigated.

The houses supplied by this dealer were widely distributed within the city limits, and beyond them in a southwesterly direction ; but he probably supplied not more than four per cent. of the people of the city. When it is seen that in this *scattered* route there occurred so large a proportion of the fifty cases occurring within a period of twenty-two days, as is above stated, the evidence is very convincing that in the milk supply lay the cause of the outbreak.

The statistics of the ages of the cases have some etiological significance. They are as follows :

Age in years,	10 and under	11–15	16–20	21–25	26–30	31–35	Over 35
No. of cases,	9	14	13	10	5	4	5

The usual predominance of cases in the decade 16–25, twenty-three cases, is observed ; but the unusual number below 10, in spite of the lessened susceptibility at this age, is of interest in connection with the greater use of milk by children. The ages were : one of 4, four of 6, two of 8, and two of 9.

The Source of the Milk.

This dealer had daily about 600 quarts, of which he retailed somewhat over 400 ; it came from nine farms in the adjoining town of Middlebury, but chiefly from three. Several of the places were visited ; but as it was quickly ascertained from the physicians practicing in the vicinity that no typhoid fever was known to exist except on one farm, my attention was especially directed to that one. This farm supplied daily about 160 quarts of milk, from cows which were to all appearances in good condition,

though an expert inspection was not considered necessary, as there is no connection known between typhoid fever and any bovine disease. On this farm there had been three cases of typhoid fever, the farmer, his daughter, and the farm hand. The farmer's house is situated on land somewhat higher than the barn, and separated from it by a public road. The milk intended for sale was not taken to the house, nor were the cans, which were washed on fair days in front of the barn with water drawn from a faucet in the milk-room ; and on rainy days, so it was stated, they were washed in the milk-room or adjoining room. What is called the milk-room is a part of the barn building, opening by a door on one side into the cow stable and on the other into the barnyard. In one corner, on the barnyard side, was a tank, supplied with water from a faucet, in which the cans were placed to cool the milk. The cans standing in this tank, with the covers tipped so as to leave the openings partly uncovered, were so situated as to receive any dust which might be stirred up by wind blowing through the milk-room. At the time of the first and second visits, the barnyard was very foul from the accumulation of manure, which had not been removed for many weeks, owing to the farmer's illness. The barnyard was not drained, portions of the yard being so depressed as to retain water and saturated manure several inches in depth. It is unfortunately true that the above description would apply to the cowyards of many other dairy farms in Connecticut.

The water supplies of the farm were two : a well which had not been used this year, and a spring situated about 1200 feet back of the house, and on higher land and surrounded by pasture land. The spring was not in good condition, since it was uncovered, and the numerous cattle-tracks about indicated that it was not sufficiently protected to preserve its purity. Water was conveyed to the house and barn through new iron pipes. A chemical analysis of the water was not made, as I believed that such impurities as existed at the spring would prevent any useful deductions being drawn as to contamination elsewhere. Samples for bacteriological examination were taken from the tap and the tank in the milk-room, but at so late a date, the second visit, June 28th, that it seemed unlikely that information of much value would be gained. These samples were submitted to Dr. T. G. Lee, of the Yale Medical School, who reported that he was unable to find the bacillus typhosus.

The history of the first two cases of fever on the farm is as follows: the farmer became ill, took to bed, on May 2d, and was confined for somewhat over eight weeks. Early in the illness the stools were not disinfected, but later they were, with bichloride of mercury, and properly buried. The origin of this case is unknown, but he was frequently in Waterbury, where fever existed. Previous to his illness there was no typhoid fever in Middlebury. The case had been attributed to infection from material from an old cesspool, which had been dug out in forming the cellar under a new extension of the house; but this origin is very unlikely, as it had been done several months before, and especially because there had been no previous case of fever known in either of the houses on the farm, certainly not for thirty-five years, as I was assured by Dr. Marcus DeForest, who has accurate knowledge of the sanitary history of the town.

The farm hand, aged 27, took to bed on June 7th; on the 9th he was taken to the Waterbury Hospital, where he died on the 18th. At the Hospital he stated that he had been ill more than a week before giving up, but had kept at work, as it seemed necessary to do. During this period and before, he had taken part in the milking and in the care of the cans. It would have been very undesirable to have had this done even by a person fully aware of the dangers of infecting the milk, and taking every precaution, and this was certainly not the case here. For during this period, as had been his habit, he defecated in the cow stables, throwing the stools into the barnyard, thus infecting the mass of material there. Even if the contagium did not greatly multiply here, and the conditions would seem to have been favorable for it to do so, it would most surely have been tracked about the yard and into the stable by the cattle or man, and there drying, have been disseminated as dust. Without formulating any particular hypothesis as to just how the milk became infected, it is easy to see that the situation was pregnant with possibilities. It must be remembered that gross contamination was not necessary, since it has been abundantly shown that the specific contagium of typhoid fever, excreted in the stools, has ample powers of self-multiplication; and Wolfhügel, Seitz and Heim have recently shown that milk, unsterilized as well as sterilized, is an excellent culture medium for the bacillus typhosus. I am informed by Dr. Lee that this bacillus will grow readily at the temperature at which these cans stood, not below 55° F.

On the farm, then, I found fever existing, and also special conditions favoring the contamination of the milk, beginning sometime about the first of June, and of such a nature as to render it probable that some cans would be infected and others not, during a period of several days. That the infection did occur at this place is shown to be more than probable from the following considerations: the relation which existed between the milk and the cases, as already shown; that no fever existed on the other farms from which the milk came; that owing to the high price of ice, the milk was not carried during this period to the city and stored over night at the dealer's stable, but was collected very early in the morning, and on reaching the dealer's place was simply transferred to the peddlers' wagons and at once distributed, no regularity being observed in the direction in which the cans from this farm were sent. Further, it appears that case No. 24, referred to above, was supplied by a dealer to whom milk had been sold at this farm about June 7th, when his supply was a little short. The case was a girl, ill on June 25th; no other cases in the vicinity, and no cause could be assigned until this connection was discovered. That the infection took place during the first of June is shown by a consideration of the time when the cases were taken ill in the city, as well as the time of the third case on the farm, a girl, aged nine, ill on June 17th; it was a light case. Excluding the cases discovered to have no connection with the milk on this farm, and also the possibly secondary case No. 42, the table before given appears as follows:

Date in June,	8th–10th	11th–15th	16th–20th	21st–25th	26th–30th
No. of Cases,	3	15	9	10	6

The evidence found in this investigation permits no other conclusion than the one that attributes the outbreak of the fever to the infection of the milk at the Middlebury farm. That the cases were not even more numerous in the families on this route, is undoubtedly due to the fact that only about one-quarter of the milk supplied came from this farm.

To those who are not familiar with the methods by which typhoid fever is disseminated, the explanation above given may seem a very unlikely one, or at least this method may seem to be so unusual as to be of little practical importance: but this is not the case. At the International Medical Congress of 1881, Ernest Hart, editor of the *Sanitary Record*, read a paper in which he

gave a summary of fifty epidemics of typhoid fever, embracing about 3,500 cases, due to milk infection. These epidemics had all been the subjects of detailed investigation in England alone, during the preceding eight years. Since this time many more cases have been reported in England, and undoubtedly they have occurred more frequently than has been known in our own State. The conditions which existed on the Middlebury farm were not unique: the essential faults in the arrangements there can be matched on many dairy farms in Connecticut, on which only the accident of an initial case of typhoid fever is wanting to make them also the foci of epidemics.

In England, dairy farms are now under such inspection as generally leads to the discovery and correction of dangerous conditions which ignorance or cupidity might have allowed to exist. Although such official inspection is not required by law in this State, milk producers and dealers will further their own pecuniary advancement, even if there were no other motive, by seeking for information on this subject, and by taking all necessary precautions to preserve the purity of the milk which they handle.

The following facts may be mentioned as bearing on this subject. Cases of typhoid fever are caused by infection from previous cases ; persons may be affected by this fever, and infect other persons, without being so ill themselves as to be confined to bed, and thus the disease may exist among those having the care of milk, but escape detection. The specific cause of typhoid fever is chiefly disseminated by means of the stools. The commonest method by which milk is infected is by means of the water used for washing the cans, etc., the water receiving the contagium by drainage from the contents of privies, cesspools, etc., into wells, cisterns, springs or streams. It is therefore of the highest importance that the source of water used in dairies should be carefully protected. It is to be particularly noted that water may be contaminated, even from such sources as above mentioned, without showing any evidence of it to the senses.

Privies on dairy farms should be properly located, properly constructed, and properly cared for, and their proper use should be insisted on, because of the dangers of the direct contamination of milk by those concerned in the care of it.

Some Practical Remarks About Typhoid Fever.

By R. S. Goodwin, M.D., of Thomaston, Conn.,

Member of the State Board of Health.

It is a popular fallacy to suppose that typhoid fever may be produced by many diverse causes, such as overwork, anxiety, debility, loss of sleep, a "run-down" condition, unsanitary surroundings, etc., etc. All these are predisposing influences, but they are never causes. There is but one cause, and that is the typhoid germ. Without the presence of this germ in the alimentary canal, no one ever does or can get typhoid fever. Unless this germ is inhaled or swallowed with drink or food, no other influence or condition, however unsanitary it may be, can produce the disease in question. How hard it is to learn and remember this simple fact! One would suppose, from conversation we hear, even among intelligent people, that typhoid fever is liable to occur spontaneously from almost any unhealthy condition without any definite and assignable cause. Physicians know that this is a delusion, but sometimes get tired of combating it. They know that the typhoid germ must come either directly from a person sick with the disease or indirectly from a colony of such germs, which have been bred and multiplied outside of the body, in the ground, in water or in filth. The germ never originates *de novo.*

If typhoid fever should come from a cesspool, from a sewer through defective plumbing, from drinking water or from milk, it is not because these things can originate the typhoid or any other germ, but is rather because some one has carelessly scattered the typhoid germs in these rich culture beds of infection, and the result is a large and luxuriant crop.

TO EXTERMINATE THE DISEASE.

It seems quite probable that if all typhoid germs from persons sick with the disease could be immediately and thoroughly de-

stroyed, typhoid fever could be made extremely rare in a short time. Dr. Charles Smart says that the authorities of the city of Vienna reduced the annual mortality from this disease from 340 to 11 by systematically keeping its germs out of the water supply. This is only one illustration of the truth of the proposition. Many more might be added.

Since this disease is not contagious, its abolition would be not a very difficult or impossible task. The germs about the sick person exist almost exclusively in the *excreta*, and can be easily destroyed by proper disinfectants. If every one knew this and could be compelled to act according to their knowledge, this pest could be driven almost from the face of the earth. Not many years ago surgeons began to keep germs out of wounds by means of antiseptics. Since then a new era has dawned upon surgery. Inflammation and suppuration, with their tedious and fatal consequences, have been almost abolished. What a revolution! I believe the time will come when a similar revolution will take place in medicine. No one ridicules the surgeon because he protects his patients' wounds from noxious germs by means of potent antiseptics, applied with the most fastidious care. By and by no one will ridicule the physician because he insists on the thorough and immediate disinfection of typhoid dejections, or because he compels such measures as will exclude the germs from drink and food. Then it will become a crime to scatter broadcast carelessly the seeds of this disease, and the blame will be placed where it truly belongs—on the individual who neglects sanitary precautions, and not on some irresponsible or perhaps celestial source, like the comet which "from his horrid hair shakes pestilence and war."

But at this point the practical question will arise: What are the details of the sanitary precautions necessary to bring about such beneficial results? The answer is evident. Such details must be left entirely to the direction of the physician in each case of sickness, and his orders should be implicitly and scrupulously obeyed.

It may not, however, be inappropriate to append in conclusion a few of the more obvious sanitary precautions which are agreed upon as necessary by various sanitary authorities:

PRECAUTIONS.

When a case of typhoid fever occurs, the Board of Health should be notified at once. Since the most common mode of infection is through drinking water, milk, and ice, all water and milk should be boiled before using, and ice should not be put in water to cool it. If there is a well on the premises, its condition should be investigated at once, to see if there is the possibility of drainage into it from a cesspool drain or privy vault. Dangerous water often looks clear, and has no odor or bad taste; therefore water from a suspected well should not be drunk because it looks, smells, and tastes all right.

The patient should be placed in a well-ventilated and quiet room, with or without carpet on it, and with but little furniture in it. The family need not be excluded, as there is no danger of contagion. But the hands of every one who touches the patient or his clothing should be washed with carbolized water before eating. All dishes and utensils should be placed in boiling water and cleansed before being used by others. All food or drink which has been touched but not consumed by the patient should be either burned or disinfected with chloride of lime and buried. All discharges and excretions from the patient must be immediately disinfected with chloride of lime, or, what is better, by pouring upon them a solution of corrosive sublimate made by dissolving a quarter of an ounce in a gallon of water. It is hardly necessary to add that this is very poisonous. They should then be buried in the ground, at least one hundred feet from any well or running stream. All soiled rags or paper should be burned at once. All towels, napkins, sheets, etc., used about the patient should be thoroughly boiled. A convalescent patient is not dangerous to his friends, and may have cheerful company. After the recovery or death of the patient, disinfection of the house should be intrusted to an experienced person. Sewer gases must not be permitted to enter a house through defective pipes, as they are sometimes the vehicle for the distribution of typhoid germs. Garbage heaps and filth of all kinds should be removed from the premises for the same reason, and in all cases the cellar should be thoroughly cleansed and aired.

The average annual mortality in Connecticut from typhoid fever is 325. Prof. Lindsley in his last report says: "It is not creditable to the intelligence, nor is it to the humanity of the

people that this dreadful mortality should be allowed to exist. When a case of typhoid fever occurs in any community, it is believed that its spread to others can be controlled with absolute certainty by very simple means and at slight expense. There is probably no infectious disease in which the infection is so completely under command as that of typhoid fever."

Typhoid Fever in New Haven.

By O. T. Osborne, M.D., New Haven, Conn.

The following tables were prepared to ascertain whether, or not, facts and figures authorized the injurious and incorrect reports concerning the health and sanitary condition of New Haven. These tables of facts emphatically repudiate such unfavorable reports.

First, to compare New Haven with itself, how is it to-day in comparison with yesterday as to health; how is it with 85,000 inhabitants in 1889, to what it was with 48,400 inhabitants in 1869, a period of 21 years?

There are fewer deaths per 1,000 of inhabitants to-day than there were 21 years ago, in spite of the disadvantages of increased population. The death-rate per 1,000 in 1869, was 23.37, in 1889 it was 17.50, or nearly 6 less deaths in the 1,000. [See Table No. I.] Has sanitation done this? If not, what has? It may be argued that we take better care of ourselves and our diseases than formerly. Perhaps so, but care of that kind will not prevent the occurrence of infectious diseases, or the diseases due to filth.

That sanitation, as applied to contagious diseases, does prevent very many cases, by isolation, fumigation, etc., is a fact that no one denies. That sanitation, as applied to the so-called filth diseases, does also prevent very many such cases is the point that I wish to demonstrate, and the allegation that New Haven is full of such diseases is an assertion that I wish to prove is false.

To prove the increase or decrease in deaths from zymotic diseases in New Haven in the last 20 years, it is necessary to compare the first 5 years of that period with the last 5 years, as any given one year compared with any other given one year would not be a fair comparison, as we all recognize the "on" and the "off" years for zymotics.

In the 5 years, 1869–1873 inclusive, [Table I.] there were 5,912 deaths from all causes, of which 1,741 died of zymotic diseases, i. e., 29.44 per cent. of all deaths were zymotics. In the 5 years, 1884–1888 inclusive, there were 7,194 deaths from all causes, of which 1,560 died from zymotic diseases, i. e. 21.68 per cent. of

TABLE I.—New Haven, 1869–1889.

Year.	Estimated population.	Total deaths.	Death rate per 1,000 population.	Deaths from Zymotic diseases.	Per cent. of Zymotic deaths to total mortality.	Deaths from Zymotics per 1,000 population.
1869	48,400	1,131	23.37	316	27.93	6.52
1870	50,886	1,270	24.95	376	29.60	7.38
1871	53,000	1,044	19.70	288	27.58	5.43
1872	55,100	1,231	22.34	382	31.03	6.93
1873	57,000	1,236	21.70	379	30.65	6.65
1874	58,800	1,073	18.24	219	20.78	3.79
1875	59,800	1,229	20.55	314	25.54	5.24
1876	60,000	1,228	20.46	394	32.08	6.56
1877	60,000	1,185	19.75	348	29.36	5.79
1878	60,000	1,079	17.99	237	22.89	4.11
1879	60,000	1,004	16.73	163	16.23	2.71
1880	62,882	1,121	17.82	257	22.92	4.08
1881	66,000	1,269	19.10	251	19.77	3.77
1882	72,200	1,343	18.60	299	22.26	4.14
1883	75,000	1,378	18.37	337	24.45	4.49
1884	78,000	1,369	17.55	312	22.79	3.99
1885	80,000	1,395	17.43	306	21.93	3.82
1886	80,000	1,392	17.40	292	20.97	3.64
1887	80,000	1,444	18.05	254	17.59	3.17
1888	82,000	1,594	19.44	396	24.84	4.82
1889	85,000	1,489	17.50	289	19.40	3.39

Years inclusive.	Total deaths.	Zymotic deaths.	Per cent. of Zymotics to total mortality.	Zymotic Diseases.
1869–1873	5,912	1,741	29.44	6.58 annual average deaths per 1,000.
1874–1878	5,794	1,512	26.09	5.09 annual average deaths per 1,000.
1879–1883	6,115	1,307	21.37	3.83 annual average deaths per 1,000.
1884–1888	7,194	1,560	21.68	3.80 annual average deaths per 1,000.

all deaths were zymotics, which was not only relatively very much less, but actually 181 less deaths from zymotics than in the 5 years from 1869 to 1873, and that with an increase of population of 33,600. Otherwise stated, the average yearly deaths

from zymotic diseases from 1869-1873 was 6.58 in the 1,000, while from 1884–1889 the average yearly deaths from zymotics was only 3.80 in the 1,000, or nearly one-half less.

Now, as to the filth diseases, the greater or less prevalence of which in a series of years may denote the greater or less cleanliness of a city. I shall consider typhoid fever, diphtheria and infantile diarrhœas as the best examples of filth diseases, i. e. diseases produced by, or developed from filth, with heat as more or less of a factor.

TABLE II.—New Haven, 1875–1889.

Year.	Deaths from Diphtheria and Croup.	Percentage of deaths from Diphtheria to total mortality.	Deaths from Diphtheria in 1,000 of inhabitants.	Deaths from Typhoid fever.	Percentage of Typhoid deaths to total mortality.	Deaths from Typhoid per 1,000 inhabitants.	Deaths from Infantile Diarrhœa and Cholera Infantum.	Percentage of Diarrhœal deaths to total mortality.	Deaths from Diarrhœa in 1,000 inhabitants.
1875	49	3.90	0.80	37	3.01	0.61	103	8.38	1.72
1876	109	8.87	1.81	22	1.79	0.36	124	10.09	2.06
1877	109	9.19	1.81	13	1.09	0.21	86	7.37	1.45
1878	93	8.61	1.54	14	1.29	0.23	56	5.18	0.93
1879	48	4.78	0.79	16	1.59	0.26	38	3.88	0.64
1880	73	6.51	1.16	15	1.33	0.23	63	5.61	0.99
1881	59	4.64	0.88	28	2.20	0.42	65	5.12	0.97
1882	60	4.46	0.82	24	1.78	0.33	99	7.45	1.38
1883	38	2.75	0.50	34	2.46	0.45	112	8.12	1.49
1884	48	3.50	0.61	35	2.55	0.44	125	9.13	1.60
1885	58	4.15	0.72	18	1.29	0.22	76	5.44	0.94
1886	65	4.66	0.81	28	2.01	0.34	101	7.25	1.26
1887	33	2.28	0.41	24	1.66	0.29	72	4.98	0.89
1888	62	3.88	0.75	38	2.38	0.46	137	8.59	1.66
1889	98	6.58	1.15	24	1.61	0.28	91	6.11	1.06

Years.	Total deaths from Diphtheria.	Percentage to total mortality.	Annual average deaths from Diphtheria per 1,000 inhabitants.	Total deaths from Typhoid.	Percentage to total mortality.	Annual average deaths from Typhoid per 1,000 inhabitants.	Total deaths from Diarrhœal diseases.	Percentage to total mortality.	Annual average deaths from Diarrhœal per 1,000 inhabitants.
1875–79	408	7.12	1.35	102	1.78	0.33	407	7.10	1.36
1880-84	278	4.29	0.79	136	2.09	0.37	464	7.16	1.28
1885–89	316	4.32	0.76	132	1.80	0.31	477	6.52	1.16

Table II. shows these diseases in New Haven for 15 years. From 1885–1889 there were 92 less deaths from diphtheria than from 1875–1879, and the average annual death-rate from this disease for the first 5 years of the 15 years came from 1.35 down to

0.76 in the 1,000 in spite of the increased population, giving increased danger of spreading and increased foci.

The typhoid fever deaths were more numerically from 1885 to 1889 than from 1875 to 1879, being respectively 132 and 102, but the average annual death-rate per 1,000 from typhoid shows a slight reduction, viz : from 0.33 to 0.31.

The infantile diarrhœas give 407 deaths in the 1875–1879 period, against 477 deaths in the 1885 to 1889 period, but the annual average deaths per 1,000 from it was 1.36 in the former period, and 1.16 in the latter ; again a reduction. Does this look like the unsanitary condition of New Haven that has been depicted ?

I will now briefly give a few comparisons of New Haven with other cities.

TABLE III.—Death-rate per 1,000 of population.

	1879.	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	Annual Average.
St. Louis	18.1	18.9	22.7	19.6	20.4	19.7	18.7	20.6	21.8	20.49	----	1879–88 20.09
St. Paul	----	----	----	16.52	14.40	15.67	12.08	12.15	12.78	11.80	----	1882–88 13.62
Minneapolis	14.0	18.2	16.8	22.1	25.3	20.0	17.9	15.0	17.0	15.0	13.4	1879–89 17.70
Philadelphia	17.17	20.91	22.48	22.62	22.13	21.55	22.53	20.59	21.85	----	----	1879–87 21.31
SanFr'ncisco	----	18.50	18.27	21.34	19.92	18.47	19.58	19.00	17.86	18.27	17.36	1880–89 19.05
Boston	20.38	23.53	22.67	21.91	22.76	22.48	24.04	23.17	25.18	24.57	24.42	1879–89 23.19
Chicago	----	----	25.69	23.60	19.92	19.80	18.76	19.46	20.26	19.00	----	1881–88 20.81
Montreal	27.43	26.90	27.18	27.12	25.60	26.74	46.71	25.36	----	----	----	1879–86 29.13
Brooklyn	----	----	----	----	----	----	23.09	22.24	22.72	22.72	22.17	1885–89 22.58
Hartford	----	----	22.72	23.31	25.93	20.98	21.10	19.63	20.70	21.07	----	1881–88 21.93
New Haven	16.73	17.82	19.10	18.60	18.37	17.55	17.43	17.40	18.05	19.44	17.50	1879–89 17.99
Providence	19.56	19.83	19.56	19 58	19.89	18.99	18.32	19.62	21.49	21.20	----	1879–88 19.80

Table III. shows the annual death-rate of 12 cities for as nearly 10 years as I could obtain, with the average annual death-rate. Of these cities only St. Paul and Minneapolis, with average death-rates respectively of 13.62 and 17.70 in the 1,000, have

lower averages than New Haven, whose average is 17.99 in the 1,000. The next lowest average death-rate is that of San Francisco with a jump to 19.05 in the 1,000.

Table IV. compares the zymotic diseases for as nearly 10 years as possible of the few cities that I could obtain data on this point. Of these few cities only San Francisco gives a lower yearly average of deaths from zymotics than New Haven, the former 2.75 deaths in the 1,000, the latter 3.86. The next lowest is Chicago with 5.12 deaths in the 1,000, while Hartford shows 6.00 in a 1,000 from zymotics.

Table V. compares all of the large cities for as near as possible to 10 years on diphtheria. This shows Philadelphia and Providence to have a lower yearly average of diphtheria than New Haven, though but slight difference, while the next lowest is St. Louis with a jump from New Haven 0.74 in the 1,000 to St. Louis 1.07 in 1,000.

Table VI. shows typhoid fever in the same manner, giving New Haven the *lowest* average of deaths from that disease for 10 years of all the cities it was possible to obtain statistics to compare.

Table VII. compares infantile diarrhœas, giving Chicago as lowest, with 1.17 deaths from it, the annual average per 1,000, while New Haven comes close on with 1.18 average per 1,000.

Table VIII. compares quite a number of cities in the death-rate of diphtheria, typhoid fever and infantile diarrhœas for 1888.

This year was a peculiarly poor year for New Haven to be compared with other cities, as will be seen from Table I., as we have not had as high a death-rate as 1888 gives since 1877, nor as high a death-rate from zymotics since 1877. Now, to compare Minneapolis and St. Paul, which cities were the only ones of a lower average death-rate than New Haven, we find the former to have had in 1888 a little more diphtheria than New Haven, and St. Paul is well up, only 0.12 less deaths in a 1,000 than New Haven.

As to the typhoid fever, while we had more per 1,000 in 1888 than in any year since 1875, and more than a third more than in either 1887 or 1889, still Minneapolis had 0.83 deaths in the 1,000 from it, and St. Paul 0.80 deaths, to New Haven's 0.46 in a 1,000, i. e. they had nearly twice as much typhoid. St. Paul, with the lowest death-rate of any city for 1888, 11.80 in the 1,000, had

TABLE IV.—ZYMOTIC DISEASES 1879–1888.

Cities, in order of population.	1879.			1880.			1881.			1882.			1883.			1884.			1885.			1886.			1887.			1888.		
	Number of deaths.	Per cent. of total mortality.	Deaths in 1000 population.	Number of deaths.	Per cent. of total mortality.	Deaths in 1000 population.	Number of deaths.	Per cent. of total mortality.	Deaths in 1000 population.	Number of deaths.	Per cent. of total mortality.	Deaths in 1000 population.	Number of deaths.	Per cent. of total mortality.	Deaths in 1000 population.	Number of deaths.	Per cent. of total mortality.	Deaths in 1000 population.	Number of deaths.	Per cent. of total mortality.	Deaths in 1000 population.	Number of deaths.	Per cent. of total mortality.	Deaths in 1000 population.	Number of deaths.	Per cent. of total mortality.	Deaths in 1000 population.	Number of deaths.	Per cent. of total mortality.	Deaths in 1000 population.
Boston	---	26.15	5.32	-	27.20	6.40	---	26.87	6.09	---	25.30	5.54	---	26.19	5.96	---	23.67	5.32	---	19.53	4.69	---	17.73	4 10	---	19.70	4.96	---	18.05	4.43
Chicago	---	---	---	---	---	---	---	---	---	---	---	---	3053	26.42	5.26	3506	28.11	5.56	3210	25.73	4.83	3437	25.09	4.88	4164	26.89	5.48	3952	24.93	4.76
Baltimore	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1961	22.00	4.93
San Francisco	---	---	---	555	12.78	2.36	645	15.04	2.74	718	14.33	3.05	644	12.91	2 57	670	13.40	2.47	927	17 53	3.43	775	14.56	2.76	810	15.11	2.69	888	14.71	2.68
Cleveland	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1238	29.91	---	1278	28.95	5.43
New Haven	163	16.23	2.71	257	22.92	4.08	251	19.77	3.77	299	22.26	4.14	337	24.45	4.49	312	22.79	3.99	306	21.93	3.82	292	20.97	3.64	254	17.59	3.17	396	24.84	4.82
Hartford	---	---	---	---	---	---	265	27.12	6.16	314	30.60	7.13	473	40.53	10.50	304	31.83	6.67	240	24.71	5.21	164	17.76	3.48	208	20.92	4.33	231	21.48	4.52

ZYMOTIC DISEASES.

Boston	5 28 annual average deaths per 1000 for 10 years	(1879–1888.)
Chicago	5.12 " " " " 6 "	(1883–1888).
San Francisco	2.75 " " " " 9 "	(1880–1888).
New Haven	3.86 " " " " 10 "	(1879–1888).
Hartford, Ct.	6.00 " " " " 8 "	(1881–1888).

TABLE V.—DIPHTHERIA AND MEMBRANOUS CROUP, 1879–1889.

Cities.	1879.			1880.			1881.			1882.			1883.			1884.			1885.			1886.			1887.			1888.			1889.		
	Number of deaths.	Per cent. of total mortality.	Deaths in 1000 population.	Number of deaths.	Per cent. of total mortality.	Deaths in 1000 population.	Number of deaths.	Per cent. of total mortality.	Deaths in 1000 population.	Number of deaths.	Per cent. of total mortality.	Deaths in 1000 population.	Number of deaths.	Per cent. of total mortality.	Deaths in 1000 population.	Number of deaths.	Per cent. of total mortality.	Deaths in 1000 population.	Number of deaths.	Per cent. of total mortality.	Deaths in 1000 population.	Number of deaths.	Per cent. of total mortality.	Deaths in 1000 population.	Number of deaths.	Per cent. of total mortality.	Deaths in 1000 population.	Number of deaths.	Per cent. of total mortality.	Deaths in 1000 population.	Number of deaths.	Per cent. of total mortality.	Deaths in 1000 population.
Chicago	---	---	---	---	---	---	---	---	---	---	---	---	592	5.12	1.02	649	5.20	1.03	706	5.65	1.06	944	6.89	1.34	1002	6.50	1.31	858	5.44	1.03	---	---	---
Brooklyn	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	385	---	---	519	---	---	782	---	---	950	---	---	862	4.77	1.08	1101	5.95	1.29
Boston	545	7.36	1.49	774	9.07	2.13	802	8.89	2.01	575	6.39	1.40	608	6.24	1.42	487	5.06	1.13	459	4.77	1.14	423	4.56	1.05	410	4.07	1.02	589	5.77	1.41	---	---	---
New York	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1914	4.76	1.25	---	---	---
Minneapolis	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	*148	5.15	0.77	159	5.91	0.79
St. Paul	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	111	5.34	0.63	---	---	---
St. Louis	141	2.28	0.41	113	1.70	0.32	157	1.86	0.42	385	4.90	0.96	553	6.76	1.37	425	5 38	1.05	372	4.96	0.92	719	8.69	1.79	927	10.12	2.20	564	6.25	1.28	---	---	---
Philadelphia	321	2.07	0.35	323	1.82	0.38	457	2.34	0.52	933	4.65	1.05	1206	6.00	1.32	680	3.40	0 73	600	2.80	0.62	411	2.05	0.42	416	1.91	0.41	*350	1.68	0 33	---	---	---
Cincinnati	152	---	---	103	---	---	105	---	---	118	---	---	78	---	---	71	---	---	100	---	---	195	---	---	181	---	---	151	2.51	0.46	---	---	---
Baltimore	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	118	1.32	0.23	---	---	---
Cleveland	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	262	6.33	---	230	5.02	0.94	---	---	---
Providence	107	5.30	1.03	61	2.95	0.58	116	5.45	1.06	48	2.15	0.42	54	2.33	0.46	58	2.60	0.49	37	1.71	0.31	98	4.17	0 81	109	4.18	0.89	98	3.77	0.79	---	---	---
Montreal	124	3.34	0.91	106	2.84	0.76	163	4.19	1.13	163	4.17	1.13	155	4 02	1.02	285	6.53	1.74	306	3.91	1.82	257	5.52	1.39	---	---	---	---	---	---	---	---	---
New Haven	48	4.78	0.79	73	6.51	1.16	59	4.64	0.88	60	4.46	0.82	38	2.75	0.50	48	3.50	0.61	58	4.15	0.72	65	4.66	0.81	33	2.28	0.41	62	3.88	0.75	98	6.58	1.15

DIPHTHERIA.

Per year.

Chicago	1.13	average deaths	per 1000	for 6	years	(1883–1888).
Boston	1.42	"	"	" 10	"	(1879–1888).
St. Louis	1.07	"	"	" 10	"	(1879–1888).
Philadelphia	0.61	"	"	" 10	"	(1879–1888).
Providence	0.68	"	"	" 10	"	(1879–1888).
Montreal	1.23	"	"	" 8	"	(1879–1886).
New Haven	0.74	"	"	" 10	"	(1879–1888).

* Numbers marked thus were copied from the reports of cities other than the one under which the numbers occur.

TABLE VI.—TYPHOID FEVER 1879–1889.

Cities in order of size.	1879.			1880.			1881.			1882.			1883.			1884.			1885.			1886.			1887.			1888.			1889.		
	Number of deaths.	Per cent. of total mortality.	Deaths in 1000 population.	Number of deaths	Per cent. of total mortality.	Deaths in 1000 population.	Number of deaths.	Per cent. of total mortality.	Deaths in 1000 population.	Number of deaths.	Per cent. of total mortality.	Deaths in 1000 population.	Number of deaths.	Per cent. of total mortality.	Deaths in 1000 population.	Number of deaths.	Per cent. of total mortality.	Deaths in 1000 population.	Number of deaths.	Per cent. of total mortality.	Deaths in 1000 population.	Number of deaths.	Per cent. of total mortality.	Deaths in 1000 population.	Number of deaths.	Per cent. of total mortality.	Deaths in 1000 population.	Number of deaths.	Per cent. of total mortality.	Deaths in 1000 population.	Number of deaths.	Per cent. of total mortality.	Deaths in 1000 population.
New York	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	364	0.90	0.23	---	---	---
Philadelphia	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	*783	3.84	0.76	---	---	---
Brooklyn	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	107	---	---	153	---	---	123	---	---	143	---	---	124	0.68	0.15	161	0.87	0.19
Chicago	---	---	---	---	---	---	---	---	---	---	---	---	361	3.12	0.62	354	2.83	0.56	496	3.97	0.74	483	3.52	0.68	381	2.47	0.50	375	2.37	0.45	---	---	---
St. Louis	112	1.81	0.32	139	2.09	0.39	191	2.27	0.51	166	2.11	0.41	158	1.92	0.39	166	2.10	0.41	125	1.66	0.31	124	1.49	0.30	116	1,26	0.27	133	1.47	0.30	---	---	---
Baltimore	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	161	1.80	0.32	---	---	---
Boston	119	1.60	0.32	154	1.80	0.42	207	2.29	0.51	212	2.35	0.51	198	2.03	0.46	216	2.24	0.50	152	1.58	0.37	135	1.45	0.33	183	1.81	0.45	170	1.66	0.40	---	---	---
Cincinnati	91	---	---	178	---	---	183	---	---	146	---	---	136	---	---	152	---	---	116	---	---	151	---	---	403	---	---	203	3.38	0.62	---	---	---
Cleveland	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	120	2.89	---	113	2.53	0.47	---	---	---
Montreal	63	1.70	0.46	67	1.77	0.47	103	2.64	0.71	106	2.71	0.73	104	2.70	0.69	88	2.01	0.53	77	0.98	0.45	79	1.69	0.42	---	---	---	---	---	---	---	---	---
Minneapolis	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	*160	5.57	0.83	134	4.98	0.65
St. Paul	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	142	6.83	0.80	---	---	---
Providence	40	1.98	0.38	53	2.57	0.50	38	1.78	0.34	140	6.27	1.22	128	5.51	1.09	52	2.33	0.44	44	2.04	0.37	53	2.25	0.44	39	1.49	0.32	103	3.95	0.83	---	---	---
New Haven	16	1.59	0.26	15	1.33	0.23	28	2.20	0.42	24	1.78	0.33	34	2.46	0.45	35	2.55	0.44	18	1.29	0.22	28	2.01	0.34	24	1.66	0.29	38	2.38	0.46	24	1.61	0.28

TYPHOID FEVER.

	Per year.				
Chicago	0.59	average deaths per 1000 for 6 years			(1883–1888).
St. Louis	0.36	"	"	" 10 "	(1879–1888).
Boston	0.42	"	"	" 10 "	(1879–1888).
Providence	0.59	"	"	" 10 "	(1879–1888).
Montreal	0.55	"	"	" 8 "	(1879–1886).
New Haven	0.34	"	"	" 10 "	(1879–1888).

* Numbers marked thus were copied from the reports of cities other than the one under which the numbers occur.

TABLE VII.—INFANTILE DIARRHŒA AND CHOLERA INFANTUM, 1879–1889.*

Cities.	1879.			1880.			1881.			1882.			1883.			1884.			1885.			1886.			1887.			1888.			1889.		
	Number of deaths.	Per cent. of total mortality.	Deaths in 1000 population.	Number of deaths.	Per cent. of total mortality.	Deaths in 1000 population.	Number of deaths.	Per cent. of total mortality.	Deaths in 1000 population.	Number of deaths.	Per cent. of total mortality.	Deaths in 1000 population.	Number of deaths.	Per cent. of total mortality.	Deaths in 1000 population.	Number of deaths.	Per cent. of total mortality.	Deaths in 1000 population.	Number of deaths.	Per cent. of total mortality.	Deaths in 1000 population.	Number of deaths.	Per cent. of total mortality.	Deaths in 1000 population.	Number of deaths.	Per cent. of total mortality.	Deaths in 1000 population.	Number of deaths.	Per cent. of total mortality.	Deaths in 1000 population.	Number of deaths.	Per cent. of total mortality.	Deaths in 1000 population.
Chicago	---	---	---	---	---	---	---	---	---	---	---	---	751	6.49	1.29	889	7.12	1.40	720	5.77	1.08	750	5.47	1.06	907	5.88	1.19	874	5.54	1.05	---	---	---
Brooklyn	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	†3125	17.40	3.95	1274	6.89	1.52
Boston	772	10.43	2.12	1003	11.75	2.76	870	9.64	2 18	951	10.57	2.31	1023	10.50	2.38	855	8.88	1.99	723	7.51	1.80	705	7 60	1.76	734	7.28	1.83	669	6.56	1.61	---	---	---
New York	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	3215	8.00	2.10	---	---	---
Minneapolis	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	†267	9.30	1.39	---	---	---
St. Paul	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	227	10.92	1.28	---	---	---
St. Louis	477	7.73	1.39	488	7.35	1.38	686	8.15	1.85	525	6.69	1.31	531	6.49	1.32	582	7.37	1.45	441	5.88	1.09	334	4.03	0.83	324	3.53	0.76	488	5.41	1.10	---	---	---
Philadelphia	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	†3478	17.07	3.42	---	---	---
Cincinnati	191	---	---	208	---	---	250	---	---	194	---	---	150	---	---	169	---	---	179	---	---	177	---	---	214	---	---	166	2.76	0.50	---	---	---
Baltimore	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	805	9.00	1.60	---	---	---
Cleveland	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	278	6.71	---	348	7.88	1.47	---	---	-
Montreal	453	12.23	3.35	432	11.46	3.08	448	11.52	3.13	531	13.59	3.68	463	12.02	3.07	604	13.85	3.70	441	5.63	2.62	513	11 02	2.79	---	---	---	---	---	---	---	---	---
New Haven	38	3.88	0.64	63	5.61	0.99	65	5.12	0.97	99	7.45	1.38	112	8.12	1.49	125	9.13	1.60	76	5.44	0.94	101	7.25	1.26	72	4.98	0.89	137	8.59	1.66	91	6.11	1.06

DIARRHŒA AND CHOLERA INFANTUM.

	Per years.				
Chicago	1.17	average deaths per 1000 for 6 years			(1883–1888).
Boston	2.07	"	"	" 10 "	(1879–1888).
St. Louis	1.24	"	"	" 10 "	(1879–1888).
Montreal	3.17	"	"	" 8 "	(1879–1886).
New Haven	1.18	"	"	" 10 "	(1879–1888).

* This table is not absolutely correct, as in some cases, it has been impossible to eliminate the few adult deaths from diarrhœa, from the infantile deaths. Cincinnati in this table gives deaths from cholera infantum *alone*, hence so low.

† Numbers marked thus were copied from the reports of cities other than the one under which the numbers occur.

cholera infantum and pneumonia head their death list for 1888, with equal number of deaths for each, while typhoid fever came third and diphtheria came fifth. A not very creditable showing in spite of the phenomenally low death-rate from all causes. If in Table VIII. we compare the death-rates from typhoid fever with New Haven's average for the last 5 years, viz : 0.31 in the 1,000, only New Orleans, St. Louis, New York and Brooklyn would be lower.

TABLE VIII.—1888.

Cities in order of population.	Estimated population	Total deaths.	Annual death rate per 1,000.	Deaths from Diphtheria.	Deaths from Diphtheria per 1,000.	Deaths from Diarrhœal diseases.	Deaths from Diarrhœa per 1,000.	Deaths from Typhoid Fever.	Deaths from Typhoid per 1,000.
New York	1,526,081	40,175	26.32	1,914	1.25	3,215	2.10	364	0.23
†Philadelphia	1,016,758	20,372	20.00	350	0.33	3,478	3.42	783	0.76
Chicago	830,000	15,772	19.00	858	1.03	874	1.05	375	0.45
Brooklyn	774,870	17,954	22.72	862	1.08	3,125	3.95	124	0.15
Baltimore	500,343	8,936	17.87	118	0.23	805	1.60	161	0.32
St. Louis	440,000	9,015	20.49	564	1.28	488	1.10	133	0.30
Boston	415,000	10,197	24.57	589	1.41	669	1.61	170	0.40
San Francisco	330,000	6,036	18.27	†128	0.38	†142	0.42	†158	0.47
Cincinnati	325,000	5,994	18.44	151	0.46	†474	1.50	203	0.62
†New Orleans	248,000	6,301	25.40	300	1.20	652	2.62	47	0.17
Cleveland	235,000	4,414	18.78	230	0.94	348	1.47	113	0.47
†Pittsburg	220,000	4,189	19.00	126	0.57	458	2.07	191	0.86
Minneapolis	177,743	2,674	15.00	†148	0.77	†267	1.39	†160	0.83
St. Paul	175,000	2,078	11.80	111	0.63	227	1.28	142	0.80
Providence	123,000	2,608	21.20	98	0.79	†271	2.20	103	0.83
†Denver	96,000	1,729	15.30	73	0.64	198	1.75	134	1.18
New Haven	82,000	1,594	19.44	62	0.75	137	1.66	38	0.46
†Lowell	72,000	1,765	24.51	78	1.08	201	2.78	63	0.87

† Numbers marked thus were copied from the reports of cities other than the one under which the numbers occur.

Before closing this brief report, which represents a very small amount of the work done on the accompanying tables, I wish to thank Dr. C. A. Lindsley, Dr. Wright, our Health Officer, and Mr Ward Bailey, Clerk of the New Haven Board of Health, for their kindness in placing at my disposal their collections of reports, and also for their valuable suggestions.

Since the previous tables were compiled it has been possible to obtain very complete reports of deaths in 1889, and hence Table IX. In this table thirty-three cities are compared in total death-rates, diphtheria, typhoid fever and diarrhœal diseases. In every

case deaths from "croup" or "membranous croup" are classed with diphtheria.

Typho-malarial deaths are excluded from classification with typhoid fever. (New Haven had one death from typho-malarial fever.)

Under diarrhœal diseases are included all deaths from "cholera infantum," "cholera morbus," "infantile diarrhœa," "diarrhœa," "enteritis," "entero-colitis," and "gastro-enteritis."

TABLE IX.—1889.

Cities in order of their size.	Estimated population	Total deaths.	Death rate per 1,000.	Deaths from Diphtheria and Croup.	Deaths per 1000 from Diphtheria & Croup	Deaths from Typhoid Fever.	Deaths per 1000 from Typhoid Fever.	Deaths from Diarrhœal diseases.	Deaths per 1000 from Diarrhœal diseases.
New York	1,575,073	39,679	25.19	2,291	1.45	397	0.25	3,568	2.26
Philadelphia	1,040,245	20,536	19.74	727	0.69	736	0.70	----	----
Brooklyn	852,467	18,480	22.17	1,467	1.72	161	0.18	2,361	2.76
Chicago { 1st 6 months	830,000								
Chicago { 2d 6 months	1,100,000	16,946	17.47	1,509	*1.81	453	*0.54	1,994	*2.40
Baltimore	500,343	8,703	17.40	208	0.41	191	0.36	835	1.66
St. Louis	450,000	8,004	17.78	349	0.77	146	0.32	436	0.96
Boston	420,000	10,259	24.42	683	1.62	186	0.42	706	1.68
Cincinnati	325,000	5,922	18.22	470	1.44	142	0.43	306	0.94
San Francisco	300,000	5,584	14.25	136	0.45	144	0.48	95	0.31
New Orleans	254,000	6,075	23.92	153	0.60	41	0.12	600	2.36
District of Columbia	250,000	5,152	15.96	113	0.45	170	0.68	477	1.90
Cleveland	240,310	4,414	18.36	371	1.54	185	0.76	419	1.74
Louisville	227,000	3,192	14.00	59	0.25	144	0.63	91	0.40
Milwaukee	210,000	3,188	15.20	209	0.99	48	0.23	227	1.08
Minneapolis	200,000	2,273	11.30	202	1.01	108	0.54	247	1.23
Newark	191,305	4,629	24.23	366	1.91	172	0.90	269	1.40
Kansas City	180,000	1,916	10.62	65	0.36	48	0.26	101	0.56
St. Paul	180,000	1,887	10.48	154	0.85	93	0.51	206	1.14
Toronto	178,000	2,359	13.25	74	0.41	49	0.27	180	1.01
Providence	127,000	2,510	19.76	130	1.01	59	0.46	173	1.36
Scranton	90,000	1,518	16.86	130	1.44	20	0.22	122	1.35
Toledo	89,000	1,208	13.57	140	1.57	24	0.26	93	1.04
New Haven	85,000	1,489	17.51	98	1.15	24	0.28	97	1.14
Los Angeles	80,000	751	9.37	79	0.98	37	0.46	43	0.53
Lowell	72,000	1,899	26.37	100	1.38	65	0.90	262	3.63
Atlanta	70,000	1,391	19.87	42	0.60	48	0.68	173	2.47
Fall River	69,000	1,462	21.11	25	0.36	49	0.71	223	3.23
Charleston	60,145	1,957	30.79	4	0.06	12	0.19	43	0.71
Reading	59,655	891	14.90	36	0.60	26	0.43	75	1.25
Memphis	57,494	1,322	23.29	33	0.57	37	0.64	47	0.81
Knoxville	43,706	569	13.01	12	0.27	30	0.68	22	0.50
Portland	42,048	769	18.31	19	0.45	10	0.23	56	1.33
Manchester	42,000	764	18.19	28	0.66	16	0.38	94	2.23

* The population of Chicago was considered 830,000 in computing these rates.

If in this table we personally compare New Haven with the cities of the same region, i. e. those which are subjected to the same vicissitudes of wind and weather, viz: New York, Philadelphia, Brooklyn, Boston, Newark, Providence, Lowell, Fall River, Reading, Portland, and Manchester, we find New Haven ranks second lowest in its total death-rate per 1,000 inhabitants, Reading having the least deaths in a 1,000.

As to typhoid fever, the disease most in question, New York, Brooklyn and Portland are the only cities of the above named group that have fewer deaths per 1,000 inhabitants than New Haven, while the other cities of this group have a larger typhoid death-rate than New Haven, even to two and three times as large. Reading, the only city of this group with a lower total death-rate, has half as many more deaths in the 1,000 from typhoid fever as New Haven.

Glancing at the other cities on the table we find Chicago, with a slightly lower total death-rate, had nearly twice as much typhoid fever as New Haven.

Baltimore, St. Louis and Cincinnati had more typhoid than New Haven.

The following cities of low total death-rate had more typhoid fever than New Haven: San Francisco, District of Columbia, Louisville, Minneapolis, St. Paul, and even Los Angeles, having respectively 0.48, 0.68, 0.63, 0.54, 0.51 and 0.46 deaths in the 1,000, as compared with New Haven's 0.28 deaths in the 1,000.

Kansas City, Toronto and Toledo of lower total death-rate than New Haven, had also *slightly* lower death-rates of typhoid fever per 1,000, viz: 0.26, 0.27 and 0.26 respectively to 0.28 of New Haven.

Report on Epidemic Influenza in Connecticut during the Winter of 1889-90.

By C. Purdy Lindsley, M.D.

The quotation taken from Ecclesiastes i. 9, "There is no new thing under the sun," is well exemplified in the recent epidemic of influenza, which, while it came to many of us as an entirely new type and form of disease in our professional experience, yet was an old acquaintance to many of the older practitioners, and to their fathers and grandfathers before them, changed perhaps in some of its symptomatology, and yet easily recognized as the same old visitor. In writing its history and the experience of the profession during its late visitation to our State, it may be interesting before doing so to give a brief resumé of past epidemics and the lessons they have taught. We can get this information from no clearer or more authentic source than is contained in "The Geographical and Historical Pathology of Infectious Diseases," by Dr. August Hirsch, which article is a compilation from nearly all the literature on the subject up to 1875, and the result of a careful study of hundreds of original writers, expressing their experience and views at the time of the various visitations. Confining ourselves to such outbreaks as originated in or were brought to this country, we find the first one, mentioned in the summer of 1647, had its origin in Massachusetts and Connecticut, and spread thence to the West Indies and South America. In 1655 the disease prevailed in the New England States. In 1697, Webster states it prevailed in America. Subsequent visitations were in 1732–3, 1737–8, 1757–8, 1761-2, 1767, 1772, 1780–81, 1789–90, 1798, 1807, 1815–16, 1824–5, 1826, 1832, 1843, 1850–51, 1857–8, 1861, 1873, 1874–5. A striking peculiarity of this disease, and one in which it differs from all other infectious diseases, is its invariable occurrence in epidemic form, whether confined to small areas or becoming widespread;

and it has not infrequently extended over the greater part of the globe as a true pandemic. Indeed of the above dates those of 1732–3, 1781, 1832, 1850–51, 1857–8, and 1874–5 were remarkably good examples of such extensive distribution.

Amongst more isolated outbreaks of the disease, those occurring on shipboard are particularly interesting, and many well-authenticated cases prove beyond a doubt that contagion need not be at all a factor in the transmission from place to place. In several cases of the kind, crews were attacked while lying in port or cruising, no trace of the disease having shown itself either before or after in the same region on shore. An instance of this kind is mentioned by Pop in "an epidemic in Feb. 1856 on board a Netherlands frigate in the harbor of Macassar, in which 144 out of a ship's company of 340 fell ill in a few days;" also one mentioned by Chaumeziere "on the epidemic of influenza on board a French frigate in February 1863, four days after leaving the harbor of Goreé, Senegambia: not a trace of the disease had shown itself in the town; while another ship of war, that left Goreé two days earlier and took the same course, arrived in the harbor of Brest without having had a single case of influenza on board." Again there are many instances on record where the disease has appeared on board ships on the high seas at a time when it was generally prevalent on land, and when these same vessels had held no communication whatever with an infected shore, yet the epidemic appeared on board at the same time as it was observed on the coasts in their nearest vicinity. A single authenticated instance will illustrate: "Renault in the *Med. Gaz.* of Paris records an epidemic of influenza in 1847 on board a French mail steamer, on the passage from Marseilles to Alexandria, coincident with the outbreak of the disease on the Mediterranean coasts." Many authors and writers have tried to discover, in their study of the peculiarities of this disease, some regularity or periodicity in the recurrence of epidemics, and some rule as to its course of travel; and while some have claimed some approximation to such periodicity or regularity, yet a careful perusal of the facts and data now at our command gives us nothing to substantiate such a belief; but, on the contrary, proves there is absolutely no periodicity, and that the course of its progress has been both linear and radial, to and from all points of the compass, sometimes traveling from a given point directly across a country or continent from east to west, from north to south, or

vice versa, and sometimes spreading in several directions at once as from a common center, and again sometimes attacking a large area of country almost simultaneously. Regarding the rapidity of its extension, it is quite as erratic, traveling at one time from one side of a continent to the other in a week or two, and at another time, or even perhaps at the same time in some other location, requiring weeks or even months before it extends to places even near at hand. In geographical distribution it has extended in all probability over the whole inhabited globe. Although we have no records of such epidemics from some of the uncivilized sections, and but meager accounts from many only partially civilized, yet from the fact that we have some reports of it from every country and nation with which we have any communication, it is fair to assume that the few tribes beyond our reach have not escaped, and particularly so in that we know from records that the torrid, the temperate, and the frigid zones have been alike afflicted, and with almost equal frequency. Telluric conditions likewise have little or no influence upon its course, for it has occurred with as great severity and in as great extent on marshy as on dry soils, in valleys as on plateaus, on the coast as in the interior. By the table of outbreaks, about 40 per cent. have occurred in the winter months; yet, while this is a rather large proportion, it should not bear much weight as a factor in the pathogenesis, when we consider that exactly the same course is begun and followed in the hot summer months. Conditions of race have been found to have no influence in the distribution of influenza, although in many cases foreign residents have been found much more exempt on the breaking out of an epidemic in a place than the natives; and another peculiarity which has been somewhat frequently noted in the Faröe Islands, is the fact that "it is most apt to break out on the arrival of ships from foreign ports;" and this seems to have been peculiarly noticeable, as stated in the government reports, from the circumstance that the first cases of sickness were those of the factors of the cargo and the men in their employ, the disease afterward spreading over the whole island. Similar reports have been made from other isolated and remote places, as Iceland, the Society Islands, Nicbars, and Navigator Islands; and in nearly all of these reports it is stated that the strangers themselves have been almost wholly exempt from the epidemic.

Such are a few of the interesting facts relating to this mysterious disease, the etiology of which is as obscure to-day as it was a hundred years ago—only perhaps that we now call a miasma what was then called a "fouling of the air." Yet the nature of this miasma or its source, or its mode of development and distribution, scientists are still unable to solve. Certain negative facts we have learned from its history: that it is in nowise dependent upon the current of air for its distribution, nor yet upon contagion; that it is extremely erratic in its travels, but that its general symptoms and characteristics have remained unchanged.

For statistical preservation, and to learn something of the course and history of the recent epidemic in Connecticut, the State Board of Health caused to be circulated, early in February, directly after the apparent subsidence of the disease, the following circular letter, copies of which were sent to one or more physicians in every town and city in the State:

NEW HAVEN, CONN., February, 1890.

Dr. .....

DEAR DOCTOR—With the object of compiling a brief history of the present epidemic of influenza in our State, for publication by the State Board of Health, I desire to obtain the experience of one or more of the leading practitioners in each town and city.

Will you please fill out the accompanying blank form as completely as possible, while the subject is still fresh in mind, returning the same to me as per enclosed address. I should be very glad to receive any additional remarks upon the subject which may occur to you.

Very respectfully,

C. PURDY LINDSLEY, M.D.

REPORT ON EPIDEMIC INFLUENZA.

Dr...... *Town of* .....*1890.*

1. Approximate date of first appearance in your vicinity?
2. Approximate period of greatest prevalence?
3. Approximate date of decline?
4. Prevailing and common symptoms?
5. Rare or exceptional symptoms?
6. Relative frequency of neurotic symptoms?
7. Relative frequency of catarrhal symptoms?
8. Relative frequency of gastric and enteric symptoms?
9. Highest temperature you have observed?
10. Average duration of uncomplicated cases?
11. What sequelæ most prevalent?

12. What unusual sequelæ have you observed?
13. Does the epidemic influence the results of other diseases, and how?
14. Symptoms observed in uncomplicated fatal cases?
15. At what age has it been most prevalent?

About 50 per cent. of these circulars were filled out and returned, giving information from every section of the State, and a number of physicians relating individual cases in which unusual and peculiar symptoms seemed to be developed.

It is from the coincident observation of a common subject by many observers that certain facts are demonstrated and established, and while we may learn nothing new, yet we may record for future use certain interesting data relating to its course and history amongst us.

From the seventy-five answers received, the time of the outbreak in various portions of the State ranged from the first of November, 1889, to the first week in January, 1890. Two cases only are reported so early as November 1—one from Woodstock, the other from Winchester—both in the northern part of the State. One was reported from Ellington November 28, and two the first of December—one from New Hartford, and one from Vernon. From the 10th to the 20th eighteen places are reported, very uniformly distributed over the State. From the 20th to the end of December thirty-seven places are reported, distributed with equal uniformity; and for the first week in January, 1890, fifteen places report the first appearance of the epidemic, and these too are not confined to any one section.

If the two earliest cases are well authenticated, occurring so early as November 1, it might seem that the epidemic invaded the State from the north, but the later and general outbreak over all portions of the State would rather indicate that these earlier cases might have been errors in diagnosis, and particularly so that they were so widely separated and were not centers of propagation, and that the disease did not reach its maximum earlier than in other places.

As to the period of greatest prevalence there is more uniformity, and with six exceptions they all name the month of January. Even those who reported the earlier cases on November 1 report the month of January as at its maximum, showing that while it may have had an earlier start in these places, it did not make any more rapid progress.

The subsidence of the epidemic is reported from all portions of the State as between the last week in January and the middle of February, and showing a period of disappearance as uniform and general and nearly as sudden as its advent.

The common and characteristic symptoms described by the physicians from all over the State read almost as if they had been taken from some recent work on practice. Frequently ushered in by a chill, to be followed by a moderate to severe grade of fever, accompanied by intense pain of head (sometimes frontal, sometimes occipital or both), also of the back and extremities, and great prostration out of proportion to the severity of the other symptoms. About 50 per cent. of the reports only mention cough of an irritative variety, persistent, but with little or no expectoration, occasional conjunctivitis, frequent cases of nausea and vomiting, and many of them accompanied by constipation.

Occasional less frequent symptoms observed and reported are delirium, two cases of insanity, convulsions in young children, dizziness and faintness, slight paralysis of the muscles of deglutition, chorea, hysteria in a patient who had never before suffered from such ailment, otitis media (catarrhal) with severe earache, tonsilitis, epistaxis, congestion of the kidneys with suppression of urine, dysentery, diarrhœa, and urticaria.

An analysis of all symptoms reported pertaining to the three regions most commonly affected, viz: the nervous system, the mucus membrane of the air passages, and that of the gastro-intestinal surface, shows the following result: That $\frac{7}{12}$ of all cases developed nervous symptoms, $\frac{33}{60}$ developed catarrhal symptoms of the air passages, and $\frac{1}{4}$ disturbance of the gastro-intestinal surfaces. While these figures are undoubtedly true of the last two series of symptoms, the first is probably incorrect from a misunderstanding of the question, because every report contains, as "prevailing and common symptoms" of all cases, "severe pain" and elevation of temperature; therefore in reading the fraction $\frac{7}{12}$ as the proportion developing nervous symptoms, it should be understood as meaning other symptoms than pain, or probably a more correct statement would be that all cases developed nervous symptoms.

There were two physicians reported a temperature of 107°, and four of 106°, while 103°, '4°, and '5° were quite commonly reported as an extreme elevation. The duration of acute symptoms varied

from three to seven days, when a patient considered himself able to be about again, although in a large proportion of the cases the acute symptoms were followed by a longer or shorter period of extreme prostration and lassitude, lasting weeks and even months; and even at the present writing, a year afterward, it is not at all uncommon to hear patients complain that they have never fully recovered their normal tone and vigor, and in nearly all cases this condition of prostration seemed to follow for a period varying from one to four weeks. The more frequent sequelæ in the order named are: Extreme persistent prostration or debility; bronchitis, with dry, irritative, and obstinate cough; pneumonia, neuralgia, rheumatism, and otitis media.

Of unusual sequelæ the following list shows the wide range of disturbances: Gastritis, cerebro-spinal meningitis, cerebral meningitis, œdema of face, heart failure, glaucoma, phthisis, dysentery and diarrhœa, endocarditis, acute nephritis, insanity, glandular enlargements, astigmatism, temporary melancholia, peritonitis, convulsions in children, and abortion. One peculiar report was received, interesting in therapeutics, in which the reporter stated that among the unusual symptoms observed were blindness, severe deafness, and several fatal cases of heart failure, and that his most successful treatment of the disease had been belladonna, quinine, and phenacetin.

About 50 per cent. of the reporters only have observed any effect of the epidemic upon other existing diseases, and the common sentiment of such observation is that the depressing effect upon the vitality of the patient was the chief factor in the disturbance, and that through this influence all acute diseases were prolonged, and cases of organic heart disease and pulmonary tuberculosis were given a strong impetus, causing a number of cases to terminate fatally which prior to the attack had been doing well.

There is but one case reported which might be considered a fatal uncomplicated one—that of a young infant previously well, in which the catarrhal affection of the bronchioles caused death from capillary bronchitis. In this connection, however, our attention is called to the unusual mortality from pneumonia during the month of January, when the epidemic was at its height. While this is one of the months of greatest prevalence of pneumonia in our climate, yet its mortality for 1890 was unprecedented in the history of the State. In just what relation the two

diseases were associated is not clearly proven, and we cannot perhaps at present do more than record the statements of those who have reported their observations, that in very many cases the pneumonia followed from a few days to a week after the primary attack of influenza, and was of an unusually severe type, the mortality for January, 1890, being 396, while for the same month in the preceding nine years it was as follows: 1889, 90; 1888, 133; 1887, 118; 1886, 74; 1885, 88; 1884, 69; 1883, 77; 1882, 92; 1881, 120.

Its effect upon bronchitis was also very marked, showing in January, 1890, a mortality of 97 against 25 in 1889, and 31 in 1888 for the same month.

There is a remarkable unanimity in all of the reports regarding its prevalence by ages, showing that, while no age was exexempt (cases reported from nursing infants to adolesence), yet the great majority of cases occurred from 15 to 50 years. Above that period many more were exempt in proportion to their number, while below it the proportion of cases was still less.

Report on a Series of Monthly Analyses of the Water from Two Cemetery Wells.

By Herbert E. Smith, M.D.

The analyses which are herein reported were made in compliance with a request from the State Board of Health to make monthly examinations of the water of two cemetery wells, and for the purpose of comparison, of two other wells situated in New Haven.

The cemeteries selected by the Board are those known as the Grove Street Cemetery and the St. Bernard Cemetery, both situated within the limits of the city. The former was chosen as the oldest cemetery now in use in this city and as having had but a moderate number of burials during a considerable term of years, and the latter as being a newer cemetery and having a larger number of burials annually. The well on the Green, and the York Street well, selected for comparison, are such as will well serve this purpose besides being in themselves of much interest to the public.

The Grove Street Cemetery and the Well.—This cemetery contains 17⅔ acres, consisting of the original plot of about ten acres which was devoted to the purpose of a burial place by the act of corporation of the Proprietors of the New Haven Burial Ground bearing date of 1797, and the addition of eight acres made in 1814. A portion of this ground had, therefore, been in use for ninety-two years, and all of it for seventy-five years, when the well which is the subject of the present investigation was sunk in June, 1889. During this time there had been about 12,000 interments, which gives an average of 681 per acre, or of 8 per acre annually. There have been yearly during the last ten years about 125 interments or 7 per acre, but during the last year there have been 150. There have been during the last two years but 5 interments within a radius of 50 feet from the well, which is

located in the old plot north of the middle and near the line separating the old from the newer plot.

TABLE I.—WELL IN GROVE STREET CEMETERY.

Figures indicate Milligrams per Liter, (Parts by weight per Million.)

Date.	Residue on Evaporation. Total at 100° C.	Chlorine.	Nitrogen.				Oxygen consumed from Permanganate.
			Of Free Ammonia.	Of Albuminoid Ammonia.	Of Nitrites.	Of Nitrates.	
1889.							
Dec. 16	204	18.	0.024	0.041	0.004	11.	0.50
1890.							
Jan. 15	219	21.	.012	.024	.005	12.	.35
Feb. 15	216	20.	.012	.038	.002	18.	.25
Mar. 17	233	23.	.020	.032	.003	17.	.30
Apr. 16	183	16.	.024	.038	.001	14.	.35
May 16	179	13.	.024	.038	.002	9.	.35
June 14	227	15.	.024	.054	.002	12.	.55
July 17	218	17.	.024	.056	.001	13.	.35
Aug. 18	247	20.	.014	.032	.004	17.	.75
Sept. 17	206	16.	.042	.046	.006	12.	.40
Oct. 16	171	15.	.018	.018	.002	11.	.15
Nov. 15	205	20.	.010	.024	.004	14.	.40
Average	209	17.8	0.021	0.038	0.003	13.3	0.39
Highest	247	23.	.042	.056	.006	18.	.75
Lowest	171	13.	.010	.018	.001	9.	.15

The well is what is known as a driven well. In driving the pipe a body of loam and sand was penetrated until at the depth of 30 feet below the adjacent curbstone, a hard stratum of clay was reached. Passing through this the pipe entered a stratum of sand which so choked the pipe and pump that very little water could be drawn, therefore the pipe was driven further and shortly encountered a very hard stratum which was penetrated to the depth of 41 feet below the curbing. No water could be extracted from this stratum and the progress was so slow that the attempt to penetrate it was abandoned and the pipe withdrawn. It was again driven to the first hard stratum, or 30 feet below the curbstone. The strainer at the bottom of the pipe is two feet long, consequently the water was drawn from a depth of from 28 to 30 feet. At the time the well was finished the water stood in the pipe 24 feet from the curbstone.

The St. Bernard Cemetery and the Well.—The area of this cemetery is about 30 acres, of which rather more than one half was first employed as a burial place in 1851, the remainder at subsequent dates as needed. In the older portion the graves are quite close together, but in the newer many lots are yet unused. The total number of burials is about 15,000, or an average of 560 per acre, or of 13 per acre annually. There have been for the last five years 750 burials or 25 per acre annually. The well is located on the southern boundary of the older portion and about one hundred feet from its eastern boundary. The ground is highest in this eastern portion and slopes toward the west and south, in which direction the ground water probably flows toward West River. The well is a driven well, 33 feet deep. In driving the pipe it passed through sand and gravel the whole distance. Within a radius of fifty feet from this well there have been in the last two years 75 burials, some of them being within a few feet of it.

TABLE II.—WELL IN ST. BERNARD CEMETERY.

Figures indicate Milligrams per Liter, (Parts by weight per Million.)

Date.	Residue on Evaporation. Total at 100° C.	Chlorine.	Nitrogen.				Oxygen consumed from Permanganate.
			Of Free Ammonia.	Of Albuminoid Ammonia.	Of Nitrites.	Of Nitrates.	
1889.							
Dec. 16	491	53.	0.018	0.037	0.014	36.	0.45
1890.							
Jan. 15	427	49.	.006	.026	.009	30.	.20
Feb. 15	402	49.	.004	.046	.005	32.	.20
Mar. 15	396	51.	.014	.036	.005	36.	.35
Apr. 16	330	42.	.012	.036	.006	34.	.35
May 16	430	48.	.020	.062	.016	36.	.85
June 14	460	46.	.010	.038	.016	30.	.65
July 17	363	46.	.080	.068	.004	32.	.35
Aug. 18	360	43.	.516	.076	.018	37.	.85
Sept. 21	352	44.	.012	.048	.002	30.	.85
Oct. 16	351	45.	.024	.056	.042	31.	1.15
Nov. 15	317	44.	.008	.030	.003	29.	.45
Average	390	46.7	0.060	0.047	0.012	32.8	0.56
Highest	491	53.	.516	.076	.042	37.	1.15
Lowest	317	42.	.004	.026	.002	29.	.20

The Green Well.—The Green is a public park, 16 acres in extent and situated in the oldest part of the city. Near the southeast corner at the junction of Chapel and Church Streets is the well. It is a dug well with stone walls and a covered platform on which stands the public pump ; the depth to the surface of the water is from 12 to 15 feet.

TABLE III.—WELL ON THE GREEN.

Figures indicate Milligrams per Liter, (Parts by weight per Million.)

Date.	Residue on Evaporation. Total at 100° C.	Chlorine.	Nitrogen.				Oxygen consumed from Permanganate.
			Of Free Ammonia.	Of Albuminoid Ammonia.	Of Nitrites.	Of Nitrates.	
1889.							
Dec. 16	249	22.	0.018	0.049	0.002	9.	0.50
1890.							
Jan. 15	238	19.	.006	.030	.006	4.	.25
Feb. 15	228	17.	.006	.046	.002	10.	.55
Mar. 15	229	17.	.008	.036	.002	10.	.45
Apr. 16	245	20.	.010	.054	.001	9.	.50
May 16	242	18.	.006	.032	.001	13.	.35
June 14	260	18.	.002	.026	.003	12.	.40
July 17	245	20.	.002	.038	.007	14.	.33
Aug. 18	273	21.	.008	.024	.003	16.	.30
Sept. 21	265	19.	.006	.032	.001	13.	.15
Oct. 16	261	19.	.006	.026	.001	14.	.15
Nov. 15	237	17.	.004	.026	.004	13.	.35
Average	248	18.9	0.007	0.033	0.003	11.4	0.32
Highest	273	22.	0.018	.054	.007	16.	.55
Lowest	228	17.	0.002	.026	.001	4.	.15

The York Street Well.—This is a driven well consisting of four pipes one and a half inches in diameter, taking water at a depth of 35 feet below the surface. The well supplies a bathing establishment and furnishes on an average 5,000 gallons per day, sometimes yielding at one pumping 30,000 gallons; it has been in use since 1879. The surrounding soil is all sand. The temperature of the water is said to range only between 54 and 56 degrees F.

The test for phosphates was made on all of the samples of several months, by extracting the residue from the evaporation

of 100 c. c. with nitric acid and treating with ammonium molybdate solution, always with a negative result.

Hardness determinations on two different months gave the following results in milligrams of $CaCO_3$ per liter: Grove Street, 94 and 80; St. Bernard, 116 and 125; Green, 109 and 110; York Street, 184 and 186.

TABLE IV.—WELL ON YORK STREET.

Figures indicate Milligrams per Liter, (Parts by weight per Million.)

Date.	Residue on Evaporation. Total at 100° C.	Chlorine.	Nitrogen.				Oxygen consumed from Permanganate.
			Of Free Ammonia.	Of Albuminoid Ammonia.	Of Nitrites.	Of Nitrates.	
1889.							
Dec. 16	388	39.	0.060	0.047	0.080	20.	---
1890.							
Jan. 15	407	38.	.002	.022	.005	21.	0.55
Feb. 15	425	33.	.010	.044	.005	25.	.35
Mar. 15	376	31.	.004	.034	.003	18.	.20
Apr. 16	337	23.	.110	.054	.120	14.	.40
May 16	347	26.	.008	.032	.001	16.	.15
June 16	380	25.	.446	.032	1.000	13.	1.35
July 17	366	28.	.016	.038	.001	17.	.33
Aug. 18	375	28.	.016	.038	.003	16.	.35
Sept. 17	382	28.	.020	.030	.007	15.	.35
Oct. 16	392	34.	.004	.020	.000	18.	.10
Nov. 15	397	35.	.036	.024	.004	19.	.40
Average	381	30.7	0.071	0.035	0.104	17.7	0.44
Highest	425	39.	.446	.054	1.000	25.	1.35
Lowest	337	23.	.002	.020	.000	13.	.10

The number of germs were determined in but one set of samples, those of October, when they were counted by Dr. T. G. Lee with the following result:

	Grove St. Cemetery.	St. Bernard Cemetery.	Green.	York St.
Bacteria in 100 c. c.	31	94	14	11
Moulds " "	26	42	0	5

The Rainfall and Variations in the Height of the Ground Water.—A rain gauge was kept on the roof of the Medical School, and as the samples of water were usually collected on the 16th of each month, the rainfall was calculated for periods

of a month each, ending on the 15th. The total precipitation for the thirteen months was 57.84 inches, which amount agrees closely with that observed at the U. S. Signal Station for the same period, viz. 57.14 inches, although there were considerable monthly differences.

TABLE V.—RAINFALL FOR THE MONTH ENDING

1889–90.	Nov. 15.	Dec. 15.	Jan. 15.	Feb. 15.	Mar. 15.	April 15.	May 15.	June 15.	July 15.	Aug. 15.	Sept. 15.	Oct. 15.	Nov. 15.	Total, 13 mo.
In inches.	5.16	6.54	0.87	3.96	2.87	7.13	3.64	4.36	2.50	5.23	4.21	6.21	5.16	57.84

The variations in the height of the ground water were obtained by measurements with a line in a well at 146 York Street, adjacent to the Medical School. They were as follows :

TABLE VI.—VARIATIONS IN THE HEIGHT OF THE GROUND WATER.

Date.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
Feet from curbstone to surface of water	21.70	22.00	22.35	21.90	21.70	21.90	21.85	22.70	23.00	23.35	23.40	23.00
Depth of water in the well (in feet.)	7.15	6.85	6.50	6.95	7.15	6.95	7.00	6.15	5.85	5.50	5.45	5.85

Greatest depth, 7.15 ft., least, 5.50 ft., variation, 1.65 ft.

A comparison of the curves obtained by plotting these results for total solids, chlorine, and nitrates, shows that there was no uniformity in the variations of the same ingredients in the different wells, but that in general the constituents in each well varied inversely with the height of the ground water. The constituents of the Green well were remarkably uniform in amount, the St. Bernard well showed the greatest irregularities.

An examination of the four tables of analytical results will show that the Grove Street Cemetery well and the Green well are of quite similar composition, and that the wells in St. Bernard Cemetery and on York Street are comparable. Com-

paring the results in this way, it is seen that in the first set, the free ammonia is uniformly higher in the cemetery well than in the Green well, but that the amount never reached 0.05 milligrams per liter in either of them. The figures representing organic matter (albuminoid ammonia and oxygen consumed) are very much alike in the two series, and low in both, exceeding 0.05 in but two cases in the cemetery water and in but one in that from the Green. The nitrates were present in somewhat larger quantities in the cemetery water, but the amounts of chlorine and total solids were larger in the Green water.

Comparing the other two wells it is seen that in both the free ammonia was usually below 0.02, but that it exceeded 0.05 in two cases in the cemetery water, in one case rising to 0.516, and in three cases in the York Street well, one rising to 0.446. The albuminoid ammonia was about the same in the York Street well as in the Green and the Grove Street Cemetery, and only once exceeded 0.05, while the cemetery well gave an average of 0.047 and exceeded 0.05 on four occasions. The oxygen consumed was also higher in the cemetery well. The nitrites which are products of oxidation intermediate between free ammonia and nitrates, were much more irregular in these wells than in the other set, indicating less thorough oxidation. The chlorides and nitrates were much more abundant, and the total solids somewhat more abundant in the cemetery well than in its companion.

It is noticeable that the figures for nitrates are somewhat higher in each of the cemetery wells than in the others. These nitrates owed their presence to organic matter which had been oxidized in the soil, that is they represent past contamination from which the water has been purified, they of themselves not being noxious. Regarding the source of this past organic contamination, the relation existing between the nitrates and the chlorine and the total solids is significant. For where contamination is derived from sewage, privy and cesspool leakage, a higher ratio to chlorine and total solids is to be expected than where it is the result of the decomposition of animal or vegetable remains, as these contain relatively little chlorine. Applying this test to the results on these wells we find that the ratios between nitrogen of nitrates and chlorine and total solids, calculated from the averages, are as follows :

	Nitrogen.	Chlorine.	Total Solids.
Grove Street Cemetery	1	1.34	14.9
Green	1	1.66	21.7
St. Bernard Cemetery	1	1.42	11 9
York Street	1	1.74	21.5

It is of interest to note that in the analysis of 110 well waters collected in New Haven in 1886 * the ratio of nitrogen of nitrates to chlorine and total solids was found to be as 1 to 1.91, and as 1 to 19.5, respectively. This series contained some wells grossly contaminated from privies. This comparison shows the cemetery wells to contain a distinctly higher ratio of nitrates, and may be taken as indicating the relative degree of local contamination.

Conclusions.—The ground water in the Grove Street Cemetery receives in addition to the sewage contamination common to all city ground water, an amount of contamination from the graves that is appreciable to chemical tests, but at the depth of thirty feet this water has been so thoroughly subjected to the process of oxidation that it exceeds in purity the majority of wells situated near dwellings in the city. At no time during the year has there been anything like gross contamination in the water of this cemetery.

In the St. Bernard Cemetery the ground water is much more impure, but a part of this increase is to be attributed to the drainage from that part of the city so situated as to drain through it into the West River basin. A part of the increased contamination, however, is to be attributed to the local causes. Usually the oxidation is quite complete though occasionally, as in the July and August samples, the water is sensibly contaminated with unoxidized material.

As the Green well is a rather shallow dug well in the heart of the city its good organic purity is noteworthy, and in explanation it may be stated that it is protected on the south and east by the pavements of the walks and streets, and that it probably receives its water from under the large grass plot to the northwest of it. The York Street well was usually of good organic purity, but on two occasions contained an excess of free ammonia, and once a very unusual amount of nitrites.

With regard to the possible contamination of ground water by cemeteries it has been urged that the amount of organic matter

* Report of Conn. State Board of Health, 1886.

added to the soil in cemeteries, as they are usually conducted in this country, is much smaller than what is commonly added in the form of fertilizers to cultivated fields, and that in the latter case it is undoubtedly readily oxidized in the soil. But while this is true it should not be forgotten that in one case it is placed on or near the surface and in the other it is placed from four to six feet below the surface, which is below the zone in which oxidation is most active. It may thus happen that the soil may fail to oxidize an amount of organic material applied in this way that it would readily oxidize if applied near the surface. Thus the purifying power of the soil may be more easily surpassed in the cemetery than in the field. This appears to have happened in the St. Bernard Cemetery at the time the August sample was taken. But this well is so situated that the water was drawn from an area almost directly under the place of three recent interments, and that this occurred but once under these unfavorable conditions speaks well for the oxidizing power of a deep sandy subsoil. It would seem to justify the inference that a cemetery with a deep sandy subsoil would be very unlikely to contaminate the ground water at any considerable distance from the cemetery.

The Drinking Water and Rivers Pollution Investigation.

The series of analyses of reservoir and river water now being prosecuted was begun in July, 1889, and will terminate in July of the present year. At the time the General Report* was written it was expected that a report of the work for the first year would be published in this volume, but in preparing the results obtained for publication, it became very evident that in a report so largely statistical as this must be, much would be lost in spreading the results in two separate reports, neither of which would be complete in itself. As the work of the two years pertains for the most part to the same reservoirs, there would have been also an unnecessary and confusing amount of repetition. It therefore was decided by all of those engaged in the work that the objects of the investigation and report would be best reached by making a single report on the entire series of analyses extending through two years, and such a report will appear in the next annual volume.

It should be understood, however, that some of the results have already been published in the reports of the water commissioners of the towns where the reservoirs are located. Copies of the records have also been distributed to those to whom they are most valuable; to the superintendents and engineers of water works.

The scope of the investigation has been stated on page 32 and need not be reproduced here, but it is pertinent to ask, now the series of analyses as originally projected is so nearly completed, in how far the objects of the investigation have been accomplished. The complete answer can only be found in the full report, but it may now be stated that a most satisfactory answer will be given to the primary object of the research, i. e., the answer to the

* See pages 9–11.

question, what constitutes a pure or uncontaminated surface water under the geological and climatic conditions of this State? We shall soon have a large number of analyses of the water of typical reservoirs and streams which will serve as a criterion by which we may judge the degree of purity or contamination of a given sample or series of samples presented for examination, as in the case of a proposed new water supply for a town.

Regarding the inquiry as to the character of water now being supplied to the people of the State, we shall have much valuable information. And with regard to the methods which may be adopted for the relief of objectionable impurities existing in certain reservoirs, it may be said that with few exceptions the impurities in our surface water supplies are derived from the growth of various vegetable organisms, and that a few of the reservoirs in which this contamination is the most marked should receive further and special study as the causes and remedies are obscure.

The analyses undertaken thus far have had to do with surface waters only, i. e., those of streams, and lakes or ponds, but considering the frequency with which disease is disseminated by well water and the large proportion of our population dependent upon this form of water supply, it is very desirable to complete our data by a systematic examination of our well water, and to extend the investigation to natural springs and deep artesian wells.

Adulterated Food in Connecticut.

By A. L. Winton, Jr.,

Of the Agricultural Experiment Station at New Haven.

The sale of adulterated foods in Connecticut has been carried on as a rule without restriction.

We have, it is true, a general law "to prevent the adulteration of food and other articles," but it is practically a dead letter. While the special laws with reference to the sale of adulterated butter, molasses and vinegar have been enforced and thereby much good has been accomplished, still other articles of food are grossly adulterated and the people find no protection.

The general adulteration law referred to empowers local Boards of Health to procure from dealers samples of suspected foods and drugs and have the same analyzed by one of the State chemists. In case a sample is found to be adulterated with "any deleterious or foreign ingredient" the certificate of the chemist to that effect shall be published in some paper and the cost both of the analysis and of publishing the certificate shall be paid by the seller. In all cases where samples are found to be pure the cost of analysis shall be paid by the city, borough or town whose Board of Health caused the work to be done.

The principal reasons why this law has not been enforced are :

1. Public opinion has not demanded it.

2. It calls for the expenditure of funds from the treasuries of our cities, boroughs and towns at the discretion of their several Boards of Health and our municipalities have ever been loath to give their Boards of Health proper financial support.

3. The State chemists are not equipped for making the analyses which the proper enforcement of the law would require. The food analyst should be thoroughly prepared to carry on a great variety of chemical and microscopical work.

The molasses and butter laws would likewise have failed to accomplish their purpose had not the Experiment Station at New

Haven, in addition to the agricultural work for which it was originally designed, undertaken the analysis of the samples, in order that these laws might not become a dead letter like the general law regarding adulteration ; the Station is not, however, legally compelled to do this work.

In other States, particularly in Massachusetts on one side and New York on the other, foods are examined by public analysts in public laboratories and when found to be adulterated the seller is made to pay the penalty. In some cases the offender is fined or imprisoned, in others the goods are confiscated, in others still the name of the dealer and the offense are made public.

In some measure the people in this State have profited by the work done elsewhere, chiefly in having their attention called to the subject. On the other hand it is undoubtedly true that stringent laws in other States which drive adulterated foods out of their market drive them into ours. Adulteration is profitable business and the opportunities offered in Connecticut are not neglected. Even where the best system for suppression of fraud is in operation there are dealers who, especially when the chances for profit are great, are willing to run the risk of detection.

For example, the sale of oleomargarine as butter has been so lucrative that dealers even after having been brought to justice and fined by the courts have continued in the same fraudulent business. In several cases the Dairy Commissioner secured evidence for a second and even a third conviction. It is only by eternal vigilance on the part of the inspector that such illegitimate trade is kept within bounds.

Now that the people of Connecticut are being awakened to the importance of food adulteration laws—as was evinced by clauses inserted in the platforms of both the leading political parties during the last State election*—and in view of the extensive

* Extract from the Democratic platform: "We favor legislation to protect the people from adulterated food products, and we demand that such laws shall be executed by officials who are in sympathy with them and not by political beneficiaries."

Extract from the Republican platform: "We invite attention to the various laws enacted by the Republican general assemblies in the interest of public health and against adulteration, and we declare that it is the duty of the next general assembly to adopt further measures to protect the market for the honest product and to prevent the manufacture and sale of fraudulent and injurious adulterations and imitations of foods."

adulteration practiced in other States, a better knowledge of the condition of the foods in our market seems desirable.

The object of this paper is to present such facts as are available on this point.

The articles of food which have been collected by the Dairy Commissioner and examined at the Experiment Station have been butter, molasses and vinegar. The results of the examination of butter and molasses have appeared in the reports of the commissioner and of the Station and in the court records of our towns. The analyses of vinegar have not been published, but Dr. Jenkins has kindly placed the figures at my disposal for use in preparing this paper. The Station has also from time to time analyzed suspected samples of milk and some other foods.

In order to add somewhat to our information on this subject I was commissioned in the autumn of 1890 by Dr. Lindsley, Secretary of the State Board of Health, to collect in the New Haven market and examine for adulterants samples of some foods other than those above mentioned. During the limited time allowed for the work over 150 samples were examined, the articles being milk, tea, sugar, pepper, mustard, honey, canned peas and other canned vegetables, pickles, maple syrup and cream of tartar.

My thanks are due to Dr. Jenkins, Vice-Director of the Experiment Station, for valuable advice both in examining the samples and in preparing this paper.

I.—Foods Collected by the Dairy Commissioner and Examined by the Connecticut Experiment Station at New Haven.

BUTTER.

The Act to Prevent and Punish Fraud, approved March 13, 1886, and since amended, provides that

1. Under the act "any article resembling butter in appearance, and not made wholly, salt and coloring excepted, from the milk of cows," shall be deemed imitation butter.

2. Any seller of imitation butter shall, (1) maintain in a conspicuous place in his store a sign bearing in letters of prescribed size the name of the article followed by the words "sold here," (2) keep the imitation butter in plainly labelled packages and (3) orally inform purchasers that the article is not butter.

3. Dealers or venders of food containing imitation butter, or keepers of hotels, boarding houses and restaurants furnishing guests with imitation butter or food containing it shall also maintain signs as under 2, except that the word "used" be substituted for "sold."

4. A Dairy Commissioner shall be appointed, who shall hold office two years and whose duty it shall be to enforce this law.

5. Violation of this law in any of its details shall be punished with fine or imprisonment.

The act, it will be seen, in no way interferes with the sale of oleomargarine and butterine under their proper names.

Mr. J. B. Tatem was appointed Dairy Commissioner in May, 1886, and filled the office in a very efficient manner for four years.

During this time Mr. Tatem sent to the Experiment Station at New Haven for analysis 115 suspected samples of butter purchased in different parts of the state. Examination of these samples at the station proved that 89, or 77 per cent. of the number examined, were imitation butter and were so reported to the commissioner.

On this evidence over 70 arrests were made, and in the trials which ensued, conviction was secured in almost every case, the necessary expert evidence in court being furnished by the Station.

To illustrate the effect of the law Mr. Tatem estimated* that the quantity of oleomargarine sold in the state for the year ending Sept. 1st, 1886, was 2,656,854 pounds, while for the year ending July 31st, 1888, after the law was in operation, it amounted to but 800,000 pounds.

The examination of the samples consisted in determining in the filtered butter fat: 1st. The specific gravity at 100° C. by means of the Westphal balance, and 2d. The volatile fatty acid in 2.5 grams by Reichert's method.

The results varied between the following limits: †

	Specific gravity at 100° C.	Volatile fatty acids (cc. $\frac{N}{10}$ potassium hydrate solution).
Imitation butter	.8583 to .8620	.5 to 6.4
Genuine butter	.8625 to .8666	12.82 to 16.81

* Second Report of the Dairy Commissioner of Connecticut, 1888, p. 20.

† Report Conn. Agr. Exp. Station, 1888, 105.

MOLASSES.

In 1887 an act was passed by the General Assembly making it the duty of the Dairy Commissioner to attend to the enforcement of the law against the sale of adulterated molasses.

Section 3 of the act reads as follows :

"Any person who shall adulterate any molasses in this state, or who shall knowingly sell, or offer, or expose for sale, any molasses adulterated with salts of tin, glucose, dextrose, starch, sugar, corn, syrup, or other preparations of or from starch, shall be punished by a fine not exceeding five hundred dollars, or by imprisonment not exceeding one year or both. Evidence of any violation of this act shall be *prima facie* evidence of a willful violation with knowledge."

Soon after the passage of this law Mr. Tatem collected 22 samples for analysis. Of these 9 were found to be adulterated with glucose syrup and one with salts of tin. No prosecutions were at that time made, but notice was given that thereafter the law would be enforced. As a result of this notice the sale of adulterated molasses was apparently discontinued, since 15 samples collected a short time after were all found to be pure.

This state of affairs, however, was only temporary. During the latter part of 1888 and through 1889, 42 samples were examined, of which 19 were fraudulent mixtures.

The molasses was examined in each case by polarizing a solution, which had been previously cleared with basic acetate of lead, (1) directly, (2) after inversion, at ordinary temperatures, and (3) after inversion, at 86° C. The instrument used was a Schmidt and Haensch half shade double compensation saccharimeter.

When a normal quantity of molasses was used the degrees of polarization on all the samples examined varied between the following limits :

	Direct Polarization.	Polarization after Inversion.	
		Temp. 20° C.	Temp. 88° C.
Pure Molasses	+38 to + 55	—10 to — 20	0 to + 6
Adulterated Molasses *	+65 to +118	+67 to+ 100	+18 to +95

VINEGAR.

The vinegar law approved March, 1889, and amended in June of the same year, prohibits the sale of any vinegar whatsoever

* Two samples but slightly adulterated are not included.

having an acetic acidity of less than 4 per cent. and of any cider vinegar having less than 2 per cent. of solids or not made wholly from the juice of apples.

It also prohibits the addition to vinegar of "any drug, any hurtful or foreign substance, any coloring or any acid other than acetic."

Mr. Tatem, on whom as Dairy Commissioner the enforcement of this law devolved, collected for analysis 206 samples, of which the larger part were sold for cider vinegar.

In all of these samples the acidity and solids have been determined and in addition tests have been made for sulphuric and muriatic acids.

Acidity.—Ten grams of the vinegar were titrated with standard solution of barium hydrate, using phenolphtalein as an indicator, and the acidity was reckoned as acetic acid.

Of the 206 samples:—

In	1	the acidity	was between	1.0	and	1.5	per cent.
"	2	"	"	1.5	"	2.0	"
"	6	"	"	2.0	"	2.5	"
"	12	"	"	2.5	"	3.0	"
"	32	"	"	3.0	"	3.5	"
"	29	"	"	3.5	"	4.0	"
"	34	"	"	4.0	"	4.5	"
"	38	"	"	4.5	"	5.0	"
"	20	"	"	5.0	"	5.5	"
"	15	"	"	5.5	"	6.0	"
"	12	"	"	6.0	"	6.5	"
"	5	"	"	over 6.5 per cent.			
Total	206						

Number of samples below standard	82
Percentage of samples below standard	39
Maximum acidity	8.91
Minimum "	1.49

Total solids.—Ten grams of the vinegar were evaporated to dryness and dried to constant weight. Since the law prescribes a minimum limit only for cider vinegar, only the results on samples purchased for cider vinegar are here considered:

In 2	samples	the	percentage	of solids was	between	0	and .5
" 10	"	"	"	"	.5	"	1.0
" 15	"	"	"	"	1.0	"	1.5
" 47	"	"	"	"	1.5	"	2.0
" 51	"	"	"	"	2.0	"	2.5
" 23	"	"	"	"	2.5	"	3.0
" 11	"	"	"	"	3.0	"	3.5
" 4	"	"	"	above	3.5		
Total 163							

Number of samples below standard	74
Percentage of samples below standard	46
Maximum percentage of solids	7.27
Minimum " "	.37

Mineral acids.—In no case was there evidence that mineral acids had been added.

It is not proposed to discuss here, whether or not genuine vinegar may occasionally fall a little below the limits prescribed by the vinegar law. Be this as it may, the work which has been done is sufficient to prove that much of our vinegar is of inferior quality, and in many cases, what is sold for cider vinegar is not entirely a product from the juice of apples.

II.—Other Foods Analyzed by the Experiment Station.

HONEY.

In 1888, analyses were made of six samples of comb honey, and of five samples of strained honey sold in bottles.

The strained honey, although variously labelled as "Pure Honey," "Pure Northern Honey," "Choice Clover Honey," etc., was found in each case to consist largely of glucose syrup with some flavoring matter.

The honey known to be genuine polarized to the left, both directly and at ordinary temperatures after inversion, but the artificial honey polarized from 20 to 120 degrees to the right, both before and after inversion.

MILK.

A large number of samples of milk have been tested from time to time for creameries and private parties. In several instances evidence of the sale of adulterated milk to creameries was secured, and in consequence the guilty parties were punished.

III.—Foods Examined for the State Board of Health.

MILK.

It is a matter of the gravest importance that our milk supply be pure and wholesome since the infant portion of our population is largely dependent on it for nourishment.

In New Haven and most of our Connecticut cities, no legal supervision is exercised over the sale of milk, and the average consumer is entirely at the mercy of the milk dealer. No city or town of any considerable size can afford to be without a just system of milk inspection which should work alike for the interests of the public and the honest milkman.

The law "to prevent the adulteration of milk" prohibits the bringing for manufacture to butter or cheese manufactories of any milk which has been watered, skimmed or otherwise adulterated.

It also provides that skimmed milk shall only be sold from conspicuously labelled vessels, and that "impure or adulterated" milk shall not be sold at all.

Watered and Skimmed Milk.

The most common frauds practiced by milk dealers is the sale for whole milk of milk which has been skimmed or watered—evils which are as old as civilization.

No man is deserving of more contempt than he, who, by selling milk which has been deprived of a portion of its nutritive value endangers the health of infants. The punishment for such a crime should be severe.

The double fraud of watering skimmed milk, so that it will have the specific gravity of genuine milk is quite commonly practiced, especially in localities where lactometer tests of suspected samples are considered sufficient to determine their purity.

In such cases chemical analysis furnishes the only reliable information as to their purity.

Milk Preservatives.

The use of preserving chemicals is highly objectionable for two reasons.

(1.) Because the continued use of boracic acid, borax and salicylic acid, the principal substances used for this purpose, is

considered by physiologists of the highest authority injurious to health.

(2.) When such preservatives are used there is a strong temptation to neglect in the dairy that cleanliness which otherwise is so essential for the proper preservation of milk.

Although large quantities of milk preservatives are sold in various parts of the country, no evidence can here be presented regarding their use in Connecticut since the work of collecting and testing milk was carried on the latter part of autumn, when preservatives are not so much needed and are probably not used. During the summer especially, when ice is scarce, there is an incentive to the use of preservatives, since where they are used, ice can be dispensed with.

In a circular recently sent out by the manufacturers of a well-known milk preservative, the following statement appears: "We know that many unscrupulous persons have recommended such chemicals as salicylic acid, borax, boracic acid and benzoic acid, as proper articles to preserve milk; but a little investigation will show these, by reason of their action on the human system and the health of people, to be unfit for use, and, in fact, quite injurious."

Since the preparation which this philanthropic company offer for sale consists, according to analyses by reliable chemists, largely of boracic acid, the public, in the light of this quotation, can decide as to the advisability of its use.

Milk from Diseased Cows.

The use for human food of milk from diseased cows is not only a disgusting but a dangerous practice. It is well known that many serious or even fatal cases of illness among children may be traced to the sickness of the cows on whose milk they were fed.

We have a law forbidding the sale of milk from cows "affected with tuberculosis or other blood disease"; but until we have an official inspection of milk farms, this law will be of little value in protecting the public against milk of such a dangerous character.

Analyses of Milk sold in New Haven.

During the month of November, 1890, fifty samples of milk were purchased at markets, grocery stores and bakeries, in various

parts of New Haven. Fat determinations have been made in all of these by the Babcock Test* and in addition to this total solids and specific gravity were determined in the first 20 samples and also in some others which were suspiciously low in fat.

Milk bought Saturday, Nov. 15.

Sample No.	Specific gravity.	Total solids.	Fat.	Sample No.	Specific gravity.	Total solids.	Fat.
138	1.0321	13.08	3.97	148	1.0319	11.60	3.68
139	1.0304	13.33	4.28	149	1.0318	12.38	3.92
140	1.0290	11.94	3.85	150	1.0296	12.26	3.98
141	1.0290	11.04	3.18	151	1.0290	12.19	3.91
142	1.0348	11.09	1.89	152	1.0295	13.20	3.93
143	1.0319	13.20	4.17	153	1.0319	12.60	3.48
144	1.0319	11.34	3.41	154	1.0320	11.40	2.48
145	1.0317	12.01	2·69	155	1.0301	12.03	3.65
146	1.0320	12.05	3.49	156	1.0302	11.86	3.07
147	1.0319	13.17	4.31	157	1.0325	11.86	2.99

Milk bought Wednesday, Nov. 19.

Sample No.	Specific gravity.	Total solids.	Fat.	Sample No.	Specific gravity.	Total solids.	Fat.
158	------	------	5.9	166	------	------	4.2
159	1.0324	12.27	3.20	167	------	------	3.8
160	------	------	4.0	168	------	------	4.8
161	------	------	5.3	169	------	------	3.5
162	------	------	4.2	170	------	------	3.7
163	1.0309	11.33	2.73	171	------	------	4.0
164	------	------	4.4	172	------	------	3.6
165	1.0318	11.67	2.97				

Milk bought Monday, Nov. 24.

Sample No.	Fat.	Sample No.	Fat.	Sample No.	Fat.
173	4.0	178	5.0	183	4.0
174	4.6	179	4.6	184	4.5
175	3.5	180	3.9	185	3.6
176	4.8	181	3.7	186	3.3
175	3.7	182	4.0	187	4.0

* The Babcock Test is one of the best of several rapid methods recently devised for determining fat in milk. The method is not only rapid but very accurate, giving results which, as I have found in 30 comparative trials, agree closely with those obtained by gravimetric methods.

According to the New York State law which requires that milk shall contain at least 3 per cent. of fat and 12 per cent. of solids, 8 of the samples bought Nov. 15th are below standard on solids and 4 on fat; of those bought Nov. 17th two are below on fat and also on solids; while those bought Nov. 24th all contained over 3 per cent. of fat and are probably pure or else but little adulterated.

Of the 50 samples there are at least 6, or 12 per cent. of the whole number, which may be properly regarded as adulterated, being below standard on both fat and solids.

The reason why the first 20 samples were so poor may be because they were purchased on Saturday when there is an unusual demand for milk, and hence an incentive to adulterate.

TEA.

Eighteen samples of green, black and mixed tea, mostly of low grade, have been examined for the adulterants commonly used viz: foreign leaves, exhausted leaves, mineral weighting matter and facing.

Foreign Leaves.—The tea after being soaked in hot water was spread out on paper and the shape, size, venation, serration and general appearance of the leaves carefully noted. In no case were any leaves found which were foreign to the tea plant.

Exhausted Leaves.—The Chinese collect from door to door spent leaves which after being dried and manipulated in various ways are restored in a measure to their original appearance and are used to mix with genuine tea.

Any considerable admixture of spent leaves lowers the percentage of extractive matter which in genuine tea seldom falls below 30 per cent.

Since determinations of extractive matter in the samples operated on gave results running from 31 to 39 per cent. it is probable that they did not contain spent leaves.

Mineral Weighting Matter.—The percentage of ash varied from 5.17 to 7.67 and therefore was in no case high enough to indicate that sand, soapstone, clay or other such matters had been used for weighting.

Facing.—All the green teas were found to be "faced" or "painted" with a mixture of some clayey matter, Prussian blue and a yellow dye which was probably turmeric. The Prussian

blue was in each case identified under the microscope by the angular form of the particles, and the blue color which was destroyed by potash.

Battershall in referring to the Japanese tea law says :* "The facing of tea does not appear, however, to have been considered an adulteration, its continued practice being justified by the plea that Japan tea would not suit the taste of Americans."

It is certainly true that many Americans are more particular about the color than about the purity of their food.

The U. S. Tea Adulteration Act passed in 1883 and the Japanese law prohibiting the adulteration of tea passed in 1884, have both done much to improve the quality in our market of this important food.

The results on extractive matter and ash follow.

Sample No.	Kind of Tea.	Extract.	Ash.	Price per pound.
36	Black	34.00	6.13	.50 cts.
37	"	34.10	5.17	.60
38	"	33.60	5.36	.40
39	"	30.60	6.46	.25
40	"	35.00	6.16	.35
41	"	33.60	5.89	.25
42	"	37.60	7.67	.90
43	"	32.20	5.63	.50
45	Green	37.00	6.71	—
46	"	35.40	6.84	.35
47	"	33.10	7.40	.40
48	"	38.15	6.54	.50
49	"	33.00	7.17	.40
50	"	31.48	6.63	.25
51	"	38.40	7.17	.25
52	"	37.00	6.76	.20
53	Mixed	32.80	6.98	.50
54	"	33.60	6.66	.40

SUGAR.

Cane sugar in its different commercial forms is, as a rule, quite free from adulteration, although occasionally grape sugar, less often, flour and *terra alba* have been detected.

The admixture of sand is improbable, the stories about sanded sugar being, it is believed, fictitious.

* Food Adulteration and its Detection, p. 18.

The various grades of brown and pulverized sugar are most liable to contain adulterants, while granulated sugar is seldom if ever tampered with. Indeed it would be a difficult matter to find a cheap substance which could be added to granulated sugar without altering its characteristic dry, coarse-crystalline appearance.

Five samples of pulverized, two of light brown and one of dark brown sugar have been polarized, the degrees of polarization (which are also approximately percentages of cane sugar) are as follows.

Pulverized Sugar.		Light Brown Sugar.	
Sample No. 55	+99.8	Sample No. 61	+91.1
" " 56	100.0	" " 62	90.2
" " 57	99.5	Dark Brown Sugar.	
" " 58	99.6	Sample No. 60	+84.0
" " 59	99.7		

The pulverized sugar was in each case remarkably pure, polarizing but a shade lower than chemically pure sucrose.

The samples of brown sugar, because of the presence of moisture and the usual impurities, polarized lower than the pulverized sugar, but were free from adulterants.

MAPLE SYRUP.

A single bottle bearing the suspicious label of "Improved Maple Syrup," has been examined. It polarized directly +79.6 and after inversion, +34 at a temperature of 25° C. The percentage of solids was 70.50. There is no doubt that the syrup was a mixture containing glucose and possibly molasses or raw sugar.

HONEY.

In addition to the brands of strained honey which have been already examined at the Experiment Station, five others were found on sale and were purchased for analysis.

The honey polarized as follows :

Sample No.	Direct Polarization.	Polarization after Inversion. Temp. 25° C.
93	+ 92.8	+84.0
94	+ 20.0	+15.0
95	— 15.6	----
96	+100.0	+90.0
97	— 17.0	

Nos. 95 and 97 were apparently pure honey—the remainder were mixtures containing glucose syrup.

A small slice of genuine comb honey was in the jar with No. 96, but polarization showed the strained portion to be largely made up of glucose.

BLACK PEPPER.

Analysts in all countries have found pepper commonly adulterated and with a great variety of material. Among the substances which have been reported are wheat flour and bran, linseed meal, cocoanut shells, mustard husks, sawdust, olive stones, charcoal, cayenne, etc.

Most of these are used to increase bulk, care being taken to have the mixture the proper color ; cayenne, however, is added to reinforce the pungency, which has been diminished by dilution. The grinding and mixing of so-called "pepper and spice mixtures" is an extensive industry in our large cities, many thousand pounds of cheap material being used for this purpose annually.

Microscopic examinations of 13 samples of black pepper revealed the presence of foreign matter in 9. The adulterants detected together with percentages of ash are given in the following table.

Sample No.	Adulterants detected.	Ash.	Price per ¼ lb.
19	Buckwheat, Cracker Crumbs, Indian Meal, Cayenne	4.21	10c.
20	" Wheat flour, Charcoal	5.41	10c.
21	" " "	4.50	10c.
22	" Charcoal	13.65	10c.
23	Pure	5.55	12c.
24	Cracker Crumbs, Buckwheat	4.13	6c.
25	Buckwheat, Charcoal	4.06	10c.
26	Cayenne	10.99	10c.
27	Buckwheat, Ground Beans, Indian Meal, Sand	19.82*	5c.
28	Wheat flour, Buckwheat, Charcoal	4.17	10c.
29	Pure	10.82	8c.
30	Indian Meal, Wheat flour, Buckwheat, Charcoal	3.60	10c.
31	Pure	4.24	10c.

No. 23 was in a tin box, the remainder were in bulk.

All the adulterated samples contained some product from buckwheat consisting chiefly of hulls and seed coats, but also contain-

*14.75 insoluble in acid.

ing some of the starchy portion of the seed—probably bran or middlings separated in the manufacture of buckwheat flour. In potash preparations the four characteristic layers of the seed envelope were evident. (See Moeller, Mikroskopie der Nahrungs- und Genussmittel, p. 123).

Charcoal was detected in 5 of the samples. Whether this was ordinary wood charcoal or that obtained by roasting cocoanut shells, etc., could not be ascertained.

Cracker crumbs were isolated under a dissecting lens. The presence in these of wheat starch granules distorted by baking furnished confirmatory evidence.

The small quantity of cayenne in No. 26 may be explained by the fact that the dealer used the same scoop for all his spices. Otherwise the sample was pure. No. 27 contained nearly 20 per cent. of ash, three-fourths of which was sand and red clay, and must be regarded as weighting. Nos. 26 and 29, although containing rather high percentages of ash, were otherwise pure.

WHITE PEPPER.

Four samples of white pepper have been examined with the following results :

Sample No.	Adulterants.	Ash.	Price per ¼ lb.
32	Pure	2.20	10c.
33	Wheat flour	3.62	10c.
34	Wheat flour	1.83	12c.
35	Pure	---	---

MUSTARD.

A large part of what is sold in retail trade as ground mustard consists of some mustard with more or less wheat flour or some other starchy matter colored yellow with turmeric. Occasionally poisonous pigments such as chrome yellow or Martius' yellow are said to be used, but as a rule the mixtures contain nothing injurious to health, the objection to their sale as mustard being that they are cheaper substitutes sold with the purpose of deceiving the purchaser. The New York State law, while allowing the sale of such mixtures, requires that the package be properly labelled.

Of 19 samples examined, only 2 were found free from adulteration.

Particulars are given the following table:

Sample No.	Adulterants.	Ash.	Price per ¼ lb.
1	Pure	5.82	10c.
2	Wheat flour. Turmeric	6.42	10c.
3	" "	4.85	10c.
4	" " Turmeric	*20.05	10c.
5	Rice flour. "	5.35	10c.
6	Wheat flour. "	5.97	10c.
7	Pure	5.50	5c.
8	Wheat flour. Turmeric	10.57	10c.
9	Rice flour. "	4.75	5c.
10	Wheat flour. "	7.00	12c.
11	Rice and wheat flour. Turmeric	6.17	10c.
12	Wheat flour. Turmeric	5.18	10c.
13	Rice flour. "	5.32	8c.
14	Wheat flour. "	6.62	10c.
15	" " "	5.90	10c.
16	Pure	5.10	10c.
17	Wheat flour. Turmeric	4.00	10c.
18	" " "	----	10c.
19	" " "	----	15c.

* Chiefly gypsum.

No. 4 was not only adulterated but also was infested with myriads of mites.

No. 12 was put up in a tin box and labelled as a "mixture."

No. 19 was purchased of a dealer believed to be reliable, for pure English mustard.

CREAM OF TARTAR.

Cream of tartar being the most expensive of the so-called baker's chemicals is most liable to adulteration. Any kind of white pulverulent material serves for weighting, while acid phosphate of lime, alum or tartaric acid give the mixtures aerating power.

There is no difficulty in obtaining from wholesalers cream of tartar guaranteed 98 per cent. acid tartrate, and this alone is suitable for baking purposes, but most of that in the market consists either largely of foreign matter or else contains none whatever of the substance for which it is sold.

People who think by mixing their own baking powder they obtain a purer article than those sold ready-mixed, would do well to be certain of the quality of the cream of tartar used, otherwise reliable brands are to be preferred.

Of 12 samples purchased for cream of tartar but four were found to be genuine.

Foreign matter was present in such quantities as to warrant quantitative determinations, the results of which are given in the following table :

Sample No.	126	128	129	130	131	132	133	135
Lime (CaO)	15.48	24.54	25.84	30.54	12.88	20.42	19.76	11.24
Potash (K_2O)	1.16	1.02	None	None	None	5.10	6.40	9.30
Soda (Na_2O)	.82	.41	1.06	.74	1.28	1.13	1.22	1.74
Ammonia (NH_3)	.77	None	.10	None	None	None	None	.46
Alumina (Al_2O_3)	2.60	None	.47	None	None	None	Trace	1.70
Sulphuric Acid (SO_3)	10.98	36.26	13.26	39.44	13.84	30.90	6.44	22.46
Phosphoric Acid (P_2O_5)	15.16	None	10.55	7.16	3.07	None	18.10	7.93
Starch	22.20	7.75	14.15	None	45.50	6.67	10.15	6.30
Tartaric Acid, moisture and undetermined by difference.	30.83	30.02	34.57	22.12	23.43	35.78	37.93	38.87
	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Cream of tartar (acid tartrate of potash equivalent to potash found)	4.64	4.08	None	None	None	20.44	25.60	37.20
Ammonia alum (anhydrous)	11.69		1.94					7.47
Sulphate of lime	4.54	61.64	20.24	67.05	23.53	52.53	10.94	29.15
Total percentage of foreign matter determined.	68.01	68.96	65.43	77.88	76.57	59.12	55.67	51.83
Acidity (cc. of N/10 KOH neutralized by 1. gram.)	31.1	11.1	50.8	19.9	14.6	17.5	50.0	38.

Nos. 129 and 131 contained free tartaric acid.

Cream of Tartar (*Acid Tartrate of Potash*).—It will be seen by referring to these analyses that 3 of the samples contained no acid tartrate of potash at all since potash was entirely absent, 2 contained less than 5 per cent., while 3 contained potash equivalent only to from 20 to 37 per cent. If some of the potash existed, combined with acids other than tartaric, the computed percentages of acid tartrate are higher than the truth.

Foreign Matter.—The foreign matter, of which from 51 to 78 per cent. was determined consisted largely of acid phosphate of lime, sulphate of lime, alum and starch.

Acid Phosphate of Lime.—Six of the samples contained this common substitute for cream of tartar. Owing to the variable constitution of the commercial article, it being a mixture of mono-, di-, and tricalcium phosphates, no attempt has been made to compute the percentages of the combined radicals.

Sulphate of Lime.—In Nos. 126, 129 and 135 the sulphuric acid remaining after reckoning the percentage of alum was reckoned as sulphate of lime: in the remainder of the samples the total sulphuric acid was reckoned in this combination, alum being absent. The sulphate of lime must have been added in Nos. 128 and 132 as gypsum or plaster of Paris, but in some of the others may have been an impurity in the acid phosphate. In two cases the quantity present was over 60 per cent.

Alum.—The ammonia and alumina were both considered as combined in normal sulphates, and the sum of these is given in the table as anhydrous alum.

Starch.—Not only was the quantity of the starch determined but also the kind. Microscopic examination proved that in No. 126 it was from potatoes, while in the remainder it was from corn.

Acidity.—The value of cream of tartar or its substitutes as an aerating agent depends on the quantity of carbonic acid gas liberated from the bicarbonate of soda with which it is used, and is measured by the acidity. Alum, though not an acid salt, gives the same practical result, carbonic acid being liberated, while sulphates of ammonia and soda, and hydrate of alumina are left behind in the residue.

Nos. 129 and 133 had about the same acidity as good cream of tartar, but the remainder of the samples were much weaker, the acidity of No. 128 being less than one-quarter of what it should be.

Cooks, I am told, are accustomed to use 2 teaspoonfuls of cream of tartar for a loaf of cake or a batch of biscuit, but if this quantity of such a mixture as No. 128 were used, the result would be a heavy, indigestible product, containing an excess of bicarbonate of soda and over a teaspoonful of plaster.

CANNED PEAS.

It has long been known that canned French peas owe their fine green color to the presence of copper which is added in the form of sulphate during the process of canning, and the use of such a virulent poison merely for the sake of the color it imparts has called forth on all sides much adverse criticism. Even in France where these peas are claimed to be put up the laws prohibit the coppering of peas designed for home consumption but allow it in goods for export trade. In England likewise the laws are strict on this point, and prosecutions have been frequent for the sale of peas proved to contain copper.

Some American Boards of Health consider copper in peas as an adulterant, while others permit the sale provided the quantity does not exceed a certain limit; still little attention is paid to the matter and dealers and purchasers both are as a rule unaware that the green color is due to copper.

There has been some discussion as to what is the combination in which the metal exists in the peas, some contending that it is combined with the protein in a form unacted on by the digestive fluids. Blyth, the English analyst says on this point:* "Since coppered peas must either (1) have a toxic action if the copper is in a soluble form, or (2) if the copper is insoluble the pea must be deprived of some of its nutritive properties, the analyst need have no hesitation in certifying that peas made green with copper are adulterated under the sale of food and drug act."

Even if the copper is in a poisonous form, of course the quantity present is not sufficient to produce immediate symptoms of poisoning, but the continued use of food containing small quantities of such a poison is quite probably injurious to health, especially as some people are affected by extremely slight doses. Sulphate of copper ought not certainly to find a place in an establishment where foods are being prepared. Although small quantities are intentionally used, the consumer, knowing from experience how liable cooks are to oversalt their dishes, cannot but think of what would be the consequences if, through some blunder, a poisonous dose had been added.

Nine brands of French peas found on sale in New Haven all contained copper. In the following table are given the results of quantitative determinations.

* Foods: Composition and Analysis, p. 189.

Sample No.	Grains of copper per can.	Equivalent to grains of crystallized sulphate of copper.	Price per can.
100	.0276	1.6	16 cts.
101	.0064	.4	20
102	.0280	1.6	20
104	.0200	1.2	50
112	.0200	1.2	25
113	.0354	2.1	16
114	.0076	.5	16
115	.0184	1.1	20
116	.0272	1.6	15

No. 104 was in glass, the remainder in tins.

Two brands of American peas were tested for copper with negative results. As far as I have observed the unattractive yellowish-green color of American peas is alone sufficient indication that they have not been colored.

CANNED STRING BEANS.

A single can of French string beans was found to contain .0112 grams of copper equivalent to .7 grain copper, sulphate per pound can.

MIXED VEGETABLES.

Mixed vegetables (*Macédoine de légumes*) consisting generally of peas, beans, asparagus and little carrots are packed in bottles by the French and Germans in such a way as to present a very attractive appearance. Being struck by the unnatural green color of the beans and peas in one of these bottles exhibited in the window of a fancy grocer, it was purchased and the contents tested for copper.

Not only the peas and beans but also the liquor contained sufficient quantities to give strong tests.

PICKLES.

The greening of pickles either by the addition of copper salts or copper coins to the vinegar or by the use of copper or brass vessels, is practiced both in pickling establishments and in the household.

The objection to the practice does not rest merely on theory. Several well authenticated cases are on record where fatal results have followed the eating of pickles thus colored.

The following samples have been tested for copper :

No. 119. "Home made pickles," Gherkins, 85 cents per pint jar. Sold by a fancy grocer.

No. 120. Gherkins. Packed by a Connecticut firm and guaranteed free from poisonous matter. 8 cents per bottle.

No. 121. Gherkins, packed by an English firm, 25 cents per bottle.

Nos. 122 to 125. Large cucumber pickles packed in kegs. 10 cents per dozen.

Of these Nos. 119 and 121 were found to contain copper. The green of No. 119 was so marked that the clerk of whom they were purchased was asked if it were due to the glass. He replied that it was the "natural color" of the gherkin.

BAKING POWDER.

Since the principal baking powders have been analyzed by the Department of Agriculture and Board of Health chemists in New Jersey, Massachusetts, Ohio, and other States, all that was necessary in order to learn the character of the baking powders sold in our market was to note the brands on the grocers' shelves.

It was found that nearly every grocer sold in addition to the reliable tartrate powders one or more brands containing alum.

If the sale of alum baking powders is permitted it should be required that its presence be distinctly stated on the label so that the purchaser may not be deceived.

Conclusion.

It is hoped that in the near future opportunity will be offered for examining other foods, liable to adulteration, among which may be mentioned, spices of all kinds, coffee, lard, cheese, canned fruits, confectionery, and jellies. The evidence which has been produced is, however, sufficient to prove that the sale of adulterated foods is extensively carried on in the State, the material used being in some cases injurious to health, in others merely fraudulent. A subject of such importance deserves more the attention of our law-makers. While every effort is made to secure the arrest and conviction of counterfeiters of money, the counterfeiter of foods, although standing no higher in the moral scale usually goes unpunished.

This state of affairs will continue until a thorough system of food inspection is adopted. Adulteration laws properly enforced would not only save the public thousands of dollars every year, but the fines collected from offenders would go far toward defraying the extra expense incurred by the State.

Poisoning by Illuminating Gas.

By M. C. White, M.D.,

Professor of Pathology in the Medical Department of Yale University, and Medical Examiner for New Haven.

The increasing use of what is called *water gas*, mixed with *coal gas*, for illuminating purposes renders it important that accurate information should be circulated in regard to the dangers to which the public are exposed by the use of this new combination of gases for lighting our dwellings.

In the Sixth Annual Report of the State Board of Health, Lunacy, and Charity of Massachusetts, 1885, we find the following propositions, viz: Page 280. I. "With ordinary gas fixtures it is generally difficult to get more than three per cent. of illuminating gas into an ordinary room. By using one burner alone it is difficult to exceed one per cent." II. "With coal gas it is a matter of some difficulty to get into an ordinary apartment, through the ordinary burners, gas enough to produce upon healthy animals distinctly poisonous effects. With water gas, on the contrary, it is comparatively easy to get into an ordinary apartment, through the ordinary burners, gas enough to produce poisonous and even fatal effects." * * * "The only explanation which we have been able to discover is that, under the same circumstances, water gas is considerably more poisonous than coal gas."

The poisonous quality of illuminating gas, whether coal gas or water gas or a combination of the two gases, is referred to the carbonic oxide which the illuminating gas contains.

On pages 2 and 6 we find this statement: "It is not an easy matter for enough coal gas to escape into an ordinary room to produce serious consequences. Into a room containing 1,200 cubic feet of air space six cubic feet per hour of coal gas was allowed to escape for eight and a half hours, when the air in the room was found to contain only half of one per cent. of coal gas, and only 0.03 per cent. of carbonic oxide. If the coal gas had

increased to one per cent., that would have given only 0.06 per cent. of carbonic oxide, or six parts of carbonic oxide in ten thousand parts of air.

"With water gas under the same circumstances the carbonic oxide would have three-tenths of one per cent. or three parts of carbonic oxide in a thousand parts of air."

From the Report of the Gas and Electric Light Commissioners of Massachusetts for 1890, pages 12 and 13, we find that the Legislature of Massachusetts in 1880 fixed the limit of carbonic oxide that might be contained in any gas distributed in that commonwealth at ten per cent of the gas distributed, yet the Commissioners say, page 13: "In many cities and towns* a mixed gas is served, containing from ten to twenty per cent. of carbonic oxide; in other words, water gas having from twenty-five to thirty per cent. of the same constituent."

This introduction will, as I think, show the importance of reporting the following cases of poisoning by illuminating gas which have occurred in New Haven in recent years:

March 8, 1884, Mrs. L. and her daughter were found dead in their bedroom with a single gas-burner half open. The room was 10½ by 9½ ft. and 8½ ft. high, containing about 848 cubic feet. The room had one large window and a door opening into the dining-room. Coal gas was the only illuminant furnished at that time. No water gas was manufactured in New Haven at that time. In the evening of March 5, Mrs. Lewis and her daughter were seen cheerful and happy. March 6 the lady who lived on the second floor called twice and knocked on the door of Mrs. Lewis's room, but received no answer, and she supposed they had left home. At 8 P. M. groans or moaning was heard, but it was supposed to be caused by doves. In the evening of March 7 and the morning of the 8th a strong smell of gas was noticed, and the gas was shut off at the meter. In the afternoon of March 8 the door was forced open, and Mrs. L. and her daughter were found dead in their bed. The body of Mrs. L. was cold and stiff, eyes closed, head thrown back, and mouth open. She had probably died in 36 hours after retiring.

The daughter's body was not quite cold, rigor mortis not complete, eyes closed, a little froth between her lips, and a little bloody serum on the pillow. She had probably lived from 48 to 50 hours after retiring.

* This does not refer to cities in Massachusetts.

In this case it is believed that the burner was turned low, and that the light went out when the pressure of the gas was reduced near the morning of March 6. Here not over three feet per hour of coal gas could have escaped in the room, and yet two persons lost their lives—one in less than 36 hours, probably not 24 hours after the gas began to escape; and the other, a young lady in the prime of life, in about 40 or 48 hours after the light went out.

If we suppose that the amount of gas accumulating in this room of 848 cubic feet, with the burner half turned on, was equal to the amount stated in the Massachusetts Report in a room of 1,200 cubic feet where six feet per hour were admitted, then these persons died by breathing air containing only one-half per cent. of coal gas or three parts of carbonic oxide in ten thousand of air.

The Massachusetts Report for 1885, page 281, gives the probable *danger-line* for the human species at 0.5 per cent. in terms of carbonic oxide, which could scarcely have been attained in this case at any time before the death of both these ladies.

At 10 P. M. November 1, 1890, a man and a woman took lodgings together in a room 9½ feet square and 8 feet high, containing 720 cubic feet of air space, with two good-sized windows, and one door opening into a hall. At 9 A. M. November 2, they answered a knock at the door, saying "All right." At noon no answer was received. About 3 or 4 P. M. a strong smell of gas was noticed and the door was forced open, and both persons were found totally unconscious. They were taken to the Hospital about 7 P. M. with rapid pulse (120 to 130), respiration short and hurried, totally insensible, and vomiting when any fluid was forced down.

A single gas-burner in the room was found partly open. When a match was applied it burned very dim, and it is safe to say that not more than two or three feet of gas per hour escaped into the room, much of which might escape though the windows and door. From October 1 to January 1, 1891, the Gas Company made twenty million cubic feet of coal gas, which they mixed with seventeen million cubic feet of water gas. This shows that the gas furnished and used in New Haven at this time contained 17 per cent. of carbonic oxide, or nearly three times as much as is contained in coal gas.

Both patients were treated with hot applications, subcutaneous injections of whiskey and tincture of digitalis, and electricity.

At first the pulse was scarcely perceptible, but both pulse and respiration improved under the treatment, and at one time the man showed slight symptoms of returning consciousness.

At 10:30 A. M. November 2, the man was bled till a pint of blood had flowed, and a pint of three-fourths per cent. salt solution, warm and sterilized, was allowed to flow slowly into the saphena vein. So much improvement followed that small portions of milk were swallowed at short intervals. In spite of all efforts at resuscitation this man died at 2 P. M. November 4, just 48 hours after he was found unconscious. No autopsy could be obtained, but the blood drawn from the vein November 3 gave evidence of the presence of carbonic oxide. A small amount of gas was extracted by the air-pump. When this gas was applied to a small quantity of fresh blood the spectroscope gave the usual appearances produced by carbonic oxide. The amount of gas was too small for analysis by any other test.

The woman died at 6:45 A. M. November 3, seventeen hours after she was discovered unconscious. No signs of returning consciousness could be perceived at any period of her treatment.

In New Haven, December 10, 1890, Miss S., a servant girl just arrived from Germany, was found dead in her room at 7 A. M., nearly cold, and very stiff. She retired about 10 P. M., and must have died as early as 4 A. M. The room measured 10½ by 7 by 8 feet=580 cubic feet, with one window and a door, besides another door opening into a closet eight feet square. The room was filled with gas and the burner open. The girl had been warned, each night but the last, of the danger if the burner was not shut off. The gas fixture was in good order, but it has been since removed to prevent the possibility of a similar accident in the future.

In this case the quality of gas was the same, as far as known, as in the preceding case, though the exact proportions of gas supplied in New Haven from day to day are unknown. Here it is possible that thirty feet of gas escaped into this room of 580 cubic feet in six hours. As this gas is estimated to contain seventeen per cent. of carbonic oxide, we should have about one per cent. of carbonic oxide in the room at the end of six hours if none escaped. Here the danger point must have been reached at an early hour of the night, as the event proved.

The fallacy of trusting to the escape of carbonic oxide gas through the crevices of windows and doors may be illustrated by

another case which has come under my notice as Medical Examiner.

February 6, 1885, J. S. and his wife were found dead in a large bedroom in their house in Seymour. I was called to go with the Coroner and the Medical Examiner of that town to investigate the cause of these mysterious deaths. Here we found a large kitchen about 13 by 15 by 7 feet, with a bedroom of about the same dimensions adjoining. The kitchen had two windows and four doors—one for entry way, one opening into a large pantry, one leading to the cellar, one to the chamber, and one to the bedroom which had two windows. The two dead bodies were near the window at the remote side of the bedroom, and the door from the kitchen to the bedroom was open. A fire of coal was burning (as it probably had been all night) in a 14-inch cylinder gas-burner stove;* i. e., a stove constructed to burn up its own gas. The damper partly closing the pipe was turned so as to impede the draught. It was found that gas might escape into the room if the damper were turned and the stove left open.

Both of these bodies were of a rosy red tint about the neck and chest, and the lungs of both were of a bright rose color. Spectroscopic examination of the blood proved beyond question that both these persons had been poisoned by carbonic oxide gas from the coal burning in the stove above described, although the two connected rooms had a cubic air space of at least 2,700 cubic feet and were ventilated by the crevices around four windows and four doors, as well as over 500 square feet surface of outside walls.

Hoping that the facts here stated may aid in the elucidation of the dangers connected with the use of illuminating gas in which *water gas* or *gas manufactured from petroleum* forms an important part, this report is respectfully submitted.

* Cooking was done in the basement in cold weather.

TREASURER'S REPORT

For Year Ending June 30, 1890.

[Verified by vouchers in the Comptroller's Office.]

The Treasurer begs leave to report that there was received from Comptroller, on account of appropriation to State Board of Health.

1889.		
Aug. 8.	Cash, ...	$800.00
Oct.	Cash, ...	450.00
1890.		
Jan. 20.	Cash, ...	800.00
Jan. 25.	Cash, ...	450.00
April 2.	Cash, ...	450.00
June 4.	Cash, ...	800.00
	Making total receipts, . .	$3,750.00

That there has been expended up to June 30, 1890 :

For traveling and other necessary expenses of members, while on duty for Board, .	$190.71	
subscriptions to periodicals and books purchased, .	336.12	
printing, stationery, etc., .	975.17	
		1,502.00
clerical assistance, .	$595.00	
postage, box rent, etc., .	177.00	
express charges, telegrams, telephone, . .	15.10	
insurance, . . .	6.00	
		793.10
fire wood, . . .	$13.50	
office utensils and repairs, .	4.75	
apparatus for sanitary investigation, . . .	66.24	
investigating ice cream poisoning, . . .	5.00	89.49
salary of Secretary, one quarter remaining unpaid, .	1,350.00	1,350.00
		$3,734.59
By cash on hand, July 1, '90, .		15.41
		$3,750.00

TREASURER'S REPORT

To June 30, 1890.

In Account with the Appropriation for the Investigation of the Pollution of Streams.

The Treasurer begs leave to report that he has received from the Comptroller on account of the Pollution of Streams investigation :

1889.			
Aug. 1.	By Cash from Comptroller, . . .		$500.00
Oct. 15.	By Cash from Comptroller, . . .		1,000.00
1890.			
April 14.	By Cash from Comptroller, . . .		1,000.00
	Making total receipts, . . .		$2,500.00
	That there has been expended up to June 30, 1890 :		
	For books, . . .	$10.35	
	apparatus and chemicals,	28.87	
	express charges, . .	82.90	
	printing, . . .	22.50	
	salaries, expenses, etc., for expert services, . .	1,933.55	
	ice, ...	4.91	
	gas, ...	30.00	
			$2,113.08
	By balance, July 1, 1890,		386.92
			$2,500.00

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Charter, By-Laws, etc., of the Borough of Rockville.

Charter, By-Laws, etc., of the Borough of Stafford Springs.

Charter, By-Laws, etc., of the Borough of Stamford.

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Cincinnati, Ohio.
Cleveland, Ohio.
Denver, Col.
Detroit, Mich.
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Hartford, Conn.
Keokuk, Iowa.
Knoxville, Tenn.
London, Eng.
Manchester, N. H.
Mansfield, O.
Milwaukee, Wis.
Newark, N. J.
New Haven, Conn.
Newton, Mass.
Paris, France.
Portland, Me.
Rome, Italy.
St. Paul, Minn.
St. Louis, Mo.
Edinburgh.

State Board of Health.

BUREAU OF VITAL STATISTICS,

STATE OF CONNECTICUT.

REGISTRATION REPORT

FOR THE

YEAR ENDING DECEMBER 31, 1889.

NEW SERIES—No. 12.

Printed by Order of the Legislature.

NEW HAVEN, CONN.:
TUTTLE, MOREHOUSE & TAYLOR, PRINTERS.
1890.

STATE BOARD OF HEALTH

AND

BUREAU OF VITAL STATISTICS.

HON. A. E. BURR, Hartford, PRESIDENT.

DR. JOHN S. BUTLER, Hartford.

PROF. W. H. BREWER, New Haven.

DR. G. H. WILSON, Meriden.

HON. ELISHA JOHNSON, Hartford.

DR. RALPH S. GOODWIN, Thomaston.

PROF. C. A. LINDSLEY, M.D., New Haven, SECRETARY,
AND SUPERINTENDENT OF REGISTRATION OF VITAL STATISTICS.

Office of the Bureau of Vital Statistics,
State House, Hartford, Nov. 30, 1890.

To his Excellency, the Governor of the State of Connecticut:

Sir:—In accordance with the laws of this State, I have the honor to submit to you the detailed abstracts of the Births, Marriages, Divorces and Deaths, that were registered in Connecticut in the year 1889, together with a few suggestions and inferences on the main features of the Vital Statistics of that year.

Your very obedient servant,

C. A. LINDSLEY, M.D.,

Superintendent of Registration of Vital Statistics.

REGISTRATION REPORT.

1889.

To His Excellency, the Governor of Connecticut:

I have the honor to submit for your Excellency's consideration the Twelfth Annual Report on the Marriages, Births and Deaths registered in Connecticut in the year 1889, under the supervision of the State Board of Health.

Report not made from Original Certificates.

The tables comprise all the customary details connected with the subject which have heretofore been given. But it is only proper to remark that the original certificates upon which such report is based, not coming into the hands of the Superintendent of Registration, many useful tables and instructive facts are necessarily omitted. The following report is derived from abstracts only of the records in each town, as furnished by the several Town Registrars.

Improvement in the Abstracts.

It is very gratifying, however, to say that there has been through the past year a manifest improvement in the completeness and accuracy with which the requirements of the abstracts have been filled. A steady and progressive improvement in this regard has been observed for several years. The Registrars, with few exceptions, throughout the State, appreciate the importance of their duties. Many of them have had occasion to know that the omission of a record or an inaccuracy of fact has been the cause of much vexatious trouble and positive personal loss to parties to whom such records were the only means of proving facts which were necessary to maintaining their claims to property inherited, to pensions sought, or to other rights. There is

abundant evidence that this improved registration throughout the State is in marked contrast with the negligence prevalent before the organization of the State Board of Health and its superintendence of this work.

The Population.

The mutability of the population in the towns of Connecticut, the specially rapid growth of the larger towns, and the disposition of the people to migrate from the rural districts to the cities and manufacturing centers, renders the census of 1880 very unreliable, and a most untrustworthy basis for estimating the population of 1889.

Realizing these facts the Town Clerks have been requested annually for several years past to make, each, an estimate of the population of their respective towns, which request they have uniformily complied with, each basing their estimates on the school enumeration, the polling lists or such other information as they thought most accurate.

Before the present report goes to press, it happens that the census, by the United States authority, has been taken for 1890. The results of this enumeration shows that the estimated population of many of the towns of Connecticut have been very wide of the truth—some of the ambitious towns giving estimates of one or two thousand in excess of the facts, while others have fallen short of the truth in a proportional degree.

By a careful comparison of the recent census with that of 1880, a much closer approximation is possible than has been obtained by the guesses of the town officials.

Although the official report of the census has not yet been published, yet through the courtesy of the Supervisors of the Census in Connecticut, viz : Mr. McCarthy and Mr. McLaughlin, the writer has been furnished with the approximate results. He desires in this place to express his thanks to those gentlemen for their ready response to his request for the figures.

By estimates made in the manner mentioned it would appear that the total population of the State at the middle of the year 1889 was about 734,000 instead of 759,000 as stated in the Monthly Bulletin of that date, and based upon the estimates of Town Clerks.

In the following report, therefore, the Birth-rates, Death-rates, etc., have been calculated on an estimated population of 734,000.

From the recent census this is a close approximation to the true population.

From these considerations it is quite obvious that the estimated population of 1888, as given in the last annual report, was excessive. Taking the aggregate of the population of the towns as given at that time by the Town Clerks, it amounted to 759,000, a clear 25,000 higher than it is estimated this year. In the Registration report of 1888 it was mentioned, pages 13, 171 and 181, that there were reasons for suspecting that the estimated population as given then was too high.

In 72 towns the population has decreased since 1880 as shown by the recent census.

Of these, 10 are in Hartford County, to wit: Bloomfield, East Granby, East Windsor, Glastonbury, Granby, Hartland, Rocky Hill, South Windsor, Suffield and Windsor.

There are 8 in New Haven County, viz: Bethany, Cheshire, Madison, Middlebury, North Branford, Oxford, Prospect and Southbury.

There are 14 in New London County: Bozrah, Franklin, Lebanon, Ledyard, Lisbon, Lyme, Montville, North Stonington, Old Lyme, Salem, Sprague, Stonington, Voluntown and Waterford.

There are 8 in Fairfield County: Brookfield, Easton, Monroe, New Fairfield, Newtown, Sherman, Weston and Wilton.

There are 7 in Windham County: Ashford, Canterbury, Chaplin, Eastford, Hampton, Scotland and Woodstock.

There are 18 in Litchfield County: Barkhamstead, Bethlehem, Bridgewater, Canaan, Colebrook, Cornwall Goshen, Harwinton, Kent, Litchfield, Morris, New Hartford, Plymouth, Roxbury, Salisbury, Sharon, Warren and Woodbury.

There are 7 in Middlesex County: Haddam, Chatham, Clinton, Durham, East Haddam, Killingworth and Westbrook.

And there are 10 in Tolland County: Andover, Bolton, Columbia, Coventry, Ellington, Hebron, Mansfield, Tolland, Union and Willington.

The above towns are almost wholly dependent upon agricultural industries, and their depletion is due to the exodus from them to the manufacturing and business centers in the larger towns and cities of the State. So that notwithstanding in so many towns the population has diminished, it is in fact only a mere change of residence of the people, for the larger towns have increased their population so much that every county has gained during the 9 years since the last census.

The following table exhibits the rate of increase in each county :

	1880. Census Population.	1889. Estimated Population.	Per cent of Increase.
Hartford	125,382	144,100	14.9
New Haven	156,523	204,960	30.9
New London	73,152	76,210	4.2
Fairfield	112,042	146,960	31.1
Windham	43,856	45,000	2.6
Litchfield	52,044	53,130	2.0
Middlesex	35,589	38,600	8.4
Tolland	24,112	25,040	3.8
	622,700	734,000	17.8

New Haven and Fairfield Counties show much the largest growth. They are not only the most populous, but their rate of increase is also the highest. The difference between these two is only two-tenths of one per cent., a difference so slight that it may be increased or diminished by a slight error in the estimates of population. In other words, they have practically grown during the past 9 years at an equal rate.

The following is a general summary of the Births, Marriages and Deaths in 1889 :

BIRTHS.

Sex.		Parentage.	
Males	8,919	American	7,831
Females	8,163	Foreign	8,982
Not stated	94	Not stated	363
	17,176		17,176

Whole number of Births, 17,176.
Birth-rate per 1,000, 23.4.

NOTE.—If either parent is of foreign birth, the child is counted as of foreign parentage. In Table III, a closer analysis of the parentage is exhibited.

MARRIAGES.

Both American	3,277
Both foreign	1,485
Husband American, wife foreign	457
Husband foreign, wife American	514
Not stated	11
Whole number of marriages	5,744
Husband non-resident of the town where married	490
Both non-resident	225

DEATHS.

Sex.		Nativity.	
Males	6,461	American	9,487
Females	6,042	Foreign	2,862
Not stated	26	Not stated	180
	12,529		12,529

Whole number of deaths, 12,529.
Death-rate per 1,000, 17.07.

There was one birth to every 42.7 of the population.
There was one marriage to every 127.7 of the population.
There was one person married to every 63.9 of the population.
There was one death to every 58.5 of the population.

The total number of births registered in Connecticut during the year 1889 was 17,176 ; of deaths, 12,529 ; so that the natural increment or excess of births over deaths was 4,647, being 749 more than in the previous year. This is the largest natural increment that has been registered in any one year during the decade from 1880 to 1889 inclusive.

TOWNS IN WHICH DEATHS EXCEEDED THE BIRTHS.

There were 51 towns in the State in which the registered deaths exceeded the number of registered births. The natural decrease of population in this way amounted, however, to only 373.

Probably this loss of population is not real in all the towns, because the registration of births is not as complete as those of deaths.

The towns in which the registration shows this excess of deaths over births are as follows:

HARTFORD COUNTY.

	Births.	Deaths.	Loss.
Berlin	27	39	12
Bloomfield	14	25	11
Hartland	2	8	6
Newington	10	15	5
Plainville	22	38	16
So. Windsor	28	31	3
W. Hartford	18	30	12
Total loss			65

New Haven County.

	Births.	Deaths.	Loss.
Bethany	9	10	1
Madison	19	22	3
Wolcott	7	8	1
Woodbridge	7	17	10
Total loss			15

New London County.

	Births.	Deaths.	Loss.
Franklin	4	16	12
Griswold	60	62	2
Groton	87	90	3
Ledyard	11	18	7
Lyme	7	8	1
No. Stonington	22	27	5
Waterford	41	55	14
Total loss			44

Fairfield County.

	Births.	Deaths.	Loss.
Darien	39	55	16
Easton	11	19	8
Fairfield	58	68	10
Monroe	11	25	14
New Fairfield	9	10	1
Newtown	55	75	20
Ridgefield	38	40	2
Stratford	63	70	7
Trumbull	17	22	5
Wilton	26	29	3
Total loss			86

Windham County.

	Births.	Deaths.	Loss.
Ashford	8	18	10
Canterbury	5	10	5
Hampton	7	13	6
Pomfret	25	30	5
Scotland	9	16	7
Sterling	11	15	4
Thompson	102	109	7
Woodstock	33	55	22
Total loss			66

Litchfield County.

	Births.	Deaths.	Loss.
Barkhamsted	16	24	8
Bridgewater	9	14	5
Colebrook	17	26	9
Harwinton	14	15	1
Morris	7	8	1
Roxbury	17	26	9
Warren	6	13	7
Total loss			40

Middlesex County.

	Births.	Deaths.	Loss.
Chatham	26	32	6
Cromwell	25	36	11
East Haddam	42	52	10
Essex	23	34	11
Killingworth	8	11	3
Westbrook	14	17	3
Total loss			44

Tolland County.

	Births.	Deaths.	Loss.
Bolton	2	7	5
Union	9	17	8
Total loss			13

The total excess of deaths over births in all of the above towns was 373.

In the following towns the number of registered births and deaths were equal,—viz: Avon, Granby, Marlborough, North Branford, Old Saybrook, Redding and Weston—7.

Hence the natural increase of population by excess of births over deaths, of 4647 occurred wholly in 110 towns of the State.

There were by the estimated population, viz: 734,000.

23.4 Births to the 1,000.
7.82 Marriages to the 1,000.
17.07 Deaths to the 1,000.
6.33 Excess of births over deaths to the 1,000.

The daily average movement of the population was:—

Daily average of	births—males 24.4; females 22.3.	Total,	47.
" "	marriages,	"	15.7
" "	deaths—males 17.7: females 16.5.	"	34.3
" "	natural increment,	"	12.7

The number of births registered is larger than ever before. This is partly to be attributed to the better registration of births than heretofore. The Registrars throughout the State are giving more personal efforts to complete their records than they used to do. The registered marriages are 225 less than last year, and the registered deaths are 459 less than last year. The laws requiring licenses for marriage and permits for burial secure very accurate registration of those events. But the full and complete registration of births is far more difficult, and seldom attained in any country.

To aid the Registrars in the duty of making their registration as full and complete as possible in every town the following circular was sent to every physician in the State, and a supply to every Registrar for distribution to the midwives serving in their neighborhood. In consequence it is believed that fuller returns of births have been made.

CONNECTICUT STATE BOARD OF HEALTH.

SECRETARY'S OFFICE, NEW HAVEN, CONN., 1889.

To Whom it May Concern:

The following is the law of Connecticut on the matter of reporting Births occurring in the State:

"Every physician, or midwife, who shall have professional charge of the mother at the birth of any child, and every attendant who may act as midwife at such time, where no physician or midwife is employed, shall, *during the first week of the month* next succeeding such birth, furnish the Registrar of the town wherein such births may have taken place a certificate, signed by such physician, midwife, or attendant, and stating, from the best information which can be obtained, the name of such child, if it have one; the place and date of its birth; its sex; the name of its father, the maiden name of its mother; the ages, color, residence, and nationality of its parents; the occupation of its father; the number of the child, and the name and address of the medical attendant."—*Section 103, Gen. Statutes.*

The State Board of Health desires to make the registration of Births as complete as possible and expects that this law will be observed in every town in the State.

"Any person violating any of the provisions of this act, shall be punished by a fine not exceeding twenty-five dollars nor less than ten dollars."—*Section 112, Gen. Statutes.*

The numerous complaints of the Registrars in every part of the State respecting the difficulty they have in getting the Birth certificates from the doctors and midwives, indicates a widespread disregard of the law. The practice which many physicians have adopted of making their

returns only once a year, instead of monthly as the law requires, is for many reasons very objectionable.

There is more emphatic complaint against those physicians than others, because the Registrars cannot get the returns in time to make their annual report to the State Board of Health when the law requires it.

That the law is disregarded to the extent of greatly impairing the completeness of the Registration of Births, which are legal records, is evident from the low birth-rate in Connecticut. The average annual birth-rate for the last ten years, 1878 to 1887, was only 23.1 per 1,000 of the living population. While in New Haven where a nearer approximation to completeness is attained, the average rate for the fifteen years, 1874–1888, has been 30.9. The average annual birth-rate for all Europe for the thirty years, from 1856–1886, was 38.7.

The subject is one of no trivial importance. The frequency with which the records are consulted, and certificates of record given to establish claims to titles and to pensions, to determine the settlement of paupers, and to prove the rights of heirship and other rights sufficiently attests their value. The neglect of this duty by physicians and others whom the law charges with it, is a direct personal wrong inflicted upon the new born native.

Every child born in Connecticut has the right by law to have its birth recorded, with its parentage and other facts sufficient to identify it. The omission may be of serious consequence to its future interests in the world.

The physicians and midwives are paid for the duty, and have no right to neglect it.

The State Board of Health as being charged with the supervision of the Registration of Vital Statistics would respectfully appeal to all physicians, clergymen, midwives and others who are concerned in making the registration full and accurate, to comply with the requirements of the law and make their reports monthly to the Registrars, as the law demands.

Per order of Connecticut State Board of Health,

C. A. Lindsley, M.D.,

Secretary, and Superintendent of Registration of Vital Statistics.

The following table gives a summary of the Vital Statistics of the State from 1848, the date of the first Registration Report, up to the present time.

TABLE I.

Vital Statistics from 1848 to 1890.

Year.	Births.	Birth-rate per 1,000.	Mar-riages.	Deaths.	Death-rate per 1,000.	Excess of Births over Deaths.	Divorces.	No. Mar-riages to each Divorce.
1848	6,850	20	2,816	4,379	12.4	2,471	---	----
1849	7,238	20	2,920	5,049	14	2,189	---	----
1850	7,578	20.4	2,884	5,170	14	2,408	---	----
1851	8,362	22	2,995	4,767	13	3,595	---	----
1852	8,302	21.4	3,136	5,596	14.4	2,706	---	----
1853	8,439	21.3	3,202	5,646	14.2	2,793	---	----
1854	10,012	24	4,286	6,094	14.6	3,918	---	----
1856	11,139	25	4,089	6,324	14.9	4,815	---	----
1857	11,355	26	3,747	6,585	16	4,770	---	----
1858	11,299	25	3,737	6,618	15.6	4,681	---	----
1859	11,259	25	3,778	6,533	15	4,726	---	----
1860	11,873	26	4,036	7,602	16.3	4,271	310	13
1861	11,934	25	3,757	7,735	16.5	4,199	275	13.9
1862	10,803	23	3,701	8,541	18	2,262	257	14
1863	9,885	21	3,467	8,442	18	1,443	291	12
1864	9,734	20	4,107	9,109	19	625	426	9.6
1865	10,202	20.8	4,460	7,950	16	2,252	404	11
1866	11,623	23	4,978	7,520	15	4,103	488	10
1867	12,029	23.2	4,779	7,343	14 3	4,686	459	10.4
1868	12,469	23.4	4,734	7,549	15	4,920	478	9.9
1869	12,481	23.5	4,754	8,417	15.6	4,064	491	9.6
1870	13,136	24.2	4,871	8,895	15	4,241	408	11.9
1871	13,114	24	4,882	8,166	14.2	4,948	409	11.9
1872	13,805	25.3	5,023	9,970	18	3,835	464	10.8
1873	14,087	25.6	4,841	9,822	17.4	4,265	457	10.6
1874	14,450	26.2	4,694	8,939	17.2	5,511	492	9.5
1875	14,328	26	4,535	9,883	17	4,495	476	9.4
1876	13,800	25	4,320	10,187	17.5	3,613	396	10.9
1877	14,072	26	4,319	9,696	16	4,376	427	10.1
1878	13,499	24	4,315	9,352	15	4,147	401	10.7
1879	14,051	22.4	4,373	9,394	15	4,657	316	13.7
1880	13,829	22.2	4,745	10,408	16.7	3,421	332	14.2
1881	14,616	22.4	4,850	10,907	17 4	3,709	404	12
1882	14,938	23.9	5,329	11,622	18.7	3,316	392	13.5
1883	15,856	25.4	5,440	11,943	19.1	3,913	433	12.6
1884	15,758	23	5,394	11,351	16.6	4,407	360	14.7
1885	15,496	22.7	5,091	12,033	17.6	3,463	383	13.3
1866	15,934	22.2	5,497	11,616	16.2	4,318	387	14.2
1887	16,583	22.8	5,788	12,385	17	4,198	387	14.9
1888	16,878	22.2	5,969	12,980	17.1	3,898	430	13.8
1889	17,176	23.4	5,744	12,529	17.0	4,647	536	10.7

TABLE II.—HARTFORD COUNTY.

BIRTHS, MARRIAGES AND DEATHS IN THE SEVERAL TOWNS FOR THE YEAR ENDING DEC. 31, 1889.

TOWNS.	Estimated Population.	BIRTHS. Sex. Male.	Female.	Not stated.	Total.	Birth-rate per 1,000.	Parentage. Both Amer.	Both Foreign.	Am. Mother, For. Father.	Am. Father, For. Mother.	Both For. of diff. Nations.	Not stated.	MARRIAGES. Nativity. Both Amer.	Both Foreign.	Husb. Amer., Wife Foreign.	Husb. Foreign, Wife Amer.	Not stated.	Total.	Husband non-resident.	Both non-resident.	DEATHS. Sex. Male.	Female.	Not stated.	Total.	Nativity American.	Foreign.	Not stated.	Death-rate per 1,000.
Hartford	51,500	680	562	8	1250	24.2	553	453	116	93	35	...	253	109	36	40	..	438	58	26	557	510	..	1067*	773	294	..	19.6
Avon	1,170	10	12	..	22	18.8	13	8	1	...	...	...	3	1	1	...	..	5	1	...	12	10	..	22	19	3	..	18.8
Berlin	2,580	15	10	2	27	10.4	20	3	2	2	...	...	16	...	1	...	..	17	...	...	20	19	..	39	35	4	..	15.1
Bloomfield	1,300	6	8	..	14	10.7	9	4	...	1	...	...	12	...	...	...	..	12	...	...	10	15	..	25	22	3	..	19.2
Bristol	7,200	95	69	1	165	22.9	76	70	7	8	4	...	30	20	1	7	..	58	3	2	56	51	..	107	84	20	3	14.8
Burlington	1,290	28	14	..	42	32.5	17	20	2	3	...	...	2	1	...	1	..	4	1	...	21	14	..	35	21	14	..	27.1
Canton	2,500	37	28	..	65	26.0	32	29	2	2	...	...	10	8	2	1	..	21	1	...	25	26	..	51	43	8	..	20.4
East Granby	660	7	7	..	14	21.2	13	...	1	...	...	...	2	1	...	...	..	3	...	...	4	3	..	7	5	2	..	10.6
East Hartford	4,200	66	46	1	113	26.9	64	34	9	4	2	...	19	8	2	3	..	32	3	1	34	32	..	66	59	7	..	15.7
East Windsor	2,900	40	34	1	75	26.0	32	24	9	5	5	...	12	6	...	...	..	18	2	...	30	20	..	50	33	17	..	17.2
Enfield	7,000	80	84	..	164	23.4	69	49	19	17	10	...	38	11	5	4	4	62	11	9	56	70	..	126	76	50	..	18.0
Farmington	3,160	25	36	..	61	19.3	25	17	10	9	...	...	15	1	1	3	..	20	2	...	16	26	..	42	26	16	..	13.2
Glastonbury	3,460	32	39	..	71	20.5	40	21	4	6	...	...	14	1	2	3	..	20	...	...	29	29	..	58	45	13	..	16.7
Granby	1,250	9	6	..	15	12 0	15	...	...	...	...	...	6	...	...	...	..	6	...	4	10	5	..	15	15	...	..	12.0
Hartland	570	1	1	..	2	3.5	1	1	...	...	...	...	5	...	...	...	..	5	1	1	5	3	..	8	8	...	..	14.0
Manchester	8,100	84	93	1	178	22.0	50	98	9	13	8	...	26	26	...	5	..	57	2	...	63	59	1	123	84	39	..	15.1
Marlborough	570	6	4	..	10	17.5	7	3	...	...	...	...	2	1	...	...	..	3	...	...	5	5	..	10	10	...	..	17.5
New Britain	18,600	284	210	4	498	26.7	125	177	59	35	17	85	66	68	11	18	..	163	7	...	165	144	1	310	191	117	2	16.6
Newington	950	5	5	..	10	10.5	5	...	...	4	1	...	7	...	...	...	..	7	1	...	5	10	..	15	13	2	..	15.7
Plainville	1,990	14	8	..	22	11.0	11	8	1	1	1	...	10	3	3	4	..	20	1	...	15	23	..	38	32	6	..	19.0
Rocky Hill	1,070	14	11	2	27	25.2	16	8	3	...	...	...	7	2	...	...	..	9	...	1	10	6	..	16	14	2	..	15.0
Simsbury	1,860	16	11	1	28	15.0	20	5	...	2	1	...	6	3	5	...	..	14	...	..	14	13	..	27	21	2	4	14.5
Southington	5,490	57	57	..	114	20.7	62	27	11	13	1	...	17	8	2	3	..	30	1	...	32	28	..	60	44	16	..	10.9
South Windsor	1,740	14	13	1	28	16.0	21	5	2	...	...	...	7	...	...	...	..	7	2	1	17	14	..	31	29	2	..	17.8
Suffield	3,170	28	24	..	52	16.3	34	5	7	6	...	...	12	2	4	...	..	18	7	1	14	22	..	36	30	6	..	11.3
West Hartford	1,190	8	10	..	18	9.4	12	2	3	...	1	...	4	2	...	1	..	7	1	...	10	20	..	30	25	5	..	15.7
Wethersfield	2,260	17	10	..	27	11.9	20	4	1	2	...	...	12	2	...	...	..	14	...	...	18	15	..	33*	27	6	..	9.2
Windsor	2,950	36	22	..	58	19.6	37	9	6	4	2	...	19	1	...	3	..	23	6	3	28	25	..	53	42	8	3	17.9
Windsor Locks	2,700	29	32	..	61	22.6	22	18	10	7	4	...	16	7	2	3	..	28	6	16	29	28	..	57	37	20	..	21.1
Total	144,100	1743	1466	22	3231	22.4	1421	1102	294	237	92	85	648	292	78	99	4	1121	117	65	1310	1245	2	2557	1863	682	12	17.7

* Deaths of non-residents in public institutions: Hartford, 54; Wethersfield, 12; deducted from total in estimating death-rate.

TABLE II.—NEW HAVEN COUNTY.

TOWNS.	Estimated Population.	BIRTHS. Sex. Male.	Female.	Not stated.	Total.	Birth-rate per 1,000.	Parentage. Both Amer.	Both Foreign.	Am. Mother, For. Father.	Am. Father, For. Mother.	Both For. of diff. Nations.	Not stated.	MARRIAGES. Nativity. Both Amer.	Both Foreign.	Husb. Amer., Wife Foreign.	Husb. Foreign, Wife Amer.	Not stated.	Total.	Husband non-resident.	Both non-resident.	DEATHS. Sex. Male.	Female.	Not stated.	Total.	Nativity. American.	Foreign.	Not stated.	Death-rate per 1,000.
New Haven	84,500	1236	1252	3	2491	29.4	867	977	183	139	97	228	412	258	61	70	--	801	65	61	780	710	--	1490*	1067	400	23	16.9
Ansonia†	10,250	127	96	--	223	30.6	69	94	36	18	6	---	26	31	7	8	--	72	2	2	50	47	--	97	69	28	--	13.3
Beacon Falls	500	5	4	--	9	18.0	3	2	--	3	1	---	1	1	3	1	--	6	---	---	3	5	--	8	5	3	--	16.0
Bethany	550	7	2	--	9	16.3	4	2	1	---	2	---	---	---	---	---	---	---	---	---	6	4	--	10	10	---	-	18.1
Branford	4,300	50	51	4	105	24.4	41	40	9	13	---	2	13	4	3	1	--	21	2	---	27	33	1	61	43	17	1	14.1
Cheshire	1,900	14	13	--	27	14.2	14	5	4	2	2	---	9	---	1	---	--	10	---	---	12	13	--	25	16	9	--	13.1
Derby	5,900	109	120	2	231	26.0	83	97	19	19	8	5	41	24	3	12	--	80	1	1	69	81	3	153	111	42	--	17.3
East Haven	950	7	4	--	11	11.5	7	3	1	---	---	--	2	---	1	---	--	3	---	---	9	9	-	18	18	---	--	19.0
Guilford	2,780	28	21	--	49	17.5	33	5	1	10	---	---	13	2	---	2	--	17	1	---	23	17	--	40	35	5	--	14.3
Hamden	3,820	40	31	--	71	18.5	35	18	9	6	3	---	11	1	5	2	--	19	---	---	28	18	--	46	39	7	--	12.0
Madison	1,430	8	11	--	19	13 3	15	1	1	2	---	--	7	---	---	3	--	10	1	---	15	7	--	22	20	2	--	15.3
Meriden	25,000	392	339	2	733	29.4	236	343	73	47	34	---	95	81	19	11	--	206	2	1	232	194	--	426	318	105	3	17.0
Middlebury	580	4	7	--	11	19.0	9	---	1	1	---	---	---	---	---	---	---	---	---	---	3	6	--	9	8	1	--	15.5
Milford	3,800	32	29	1	62	16.3	42	11	3	3	3	---	23	4	1	2	--	30	2	9	23	27	--	50	46	4	--	13.1
Naugatuck	6,000	101	96	--	197	32.8	79	69	23	20	6	---	26	23	5	6	--	60	5	---	62	46	--	108	70	38	--	18.0
No. Branford	850	7	6	--	13	15.3	12	1	---	---	---	---	8	---	1	---	--	9	1	---	4	9	--	13	13	---	--	15.3
North Haven	1,860	13	14	1	28	15.0	12	12	2	---	2	---	12	---	---	---	--	12	---	---	12	7	--	19	17	1	1	10.2
Orange	4,500	38	27	--	65	14.4	39	19	4	3	---	---	21	2	---	5	--	28	3	---	34	29	--	63	57	6	--	14.0
Oxford	900	10	15	--	25	27.7	14	7	1	---	3	---	4	---	1	---	--	5	---	---	12	11	--	23	21	2	--	25.5
Prospect	450	3	3	--	6	13.3	3	1	2	---	---	---	---	---	---	---	---	---	---	---	2	2	--	4	4	---	--	9.0
Seymour	3,200	49	40	--	89	27.8	36	35	10	5	3	---	11	4	4	1	--	20	---	---	34	13	--	47	33	14	--	14.7
Southbury	1,100	11	10	1	22	20.0	15	1	2	1	3	---	4	1	---	---	--	5	---	---	10	6	--	16	15	1	--	15.0
Wallingford	6,400	72	75	5	152	23.7	69	55	13	10	5	---	23	6	7	4	--	40	2	2	56	41	3	100	71	19	10	15.6
Waterbury	32,000	532	484	--	1016	31.7	393	409	113	72	29	---	137	101	25	25	--	288	12	2	250	260	--	510	360	150	--	16.0
Wolcott	520	4	3	--	7	13.4	7	---	---	---	---	---	1	---	---	---	--	1	---	---	6	2	--	8	8	---	--	15.3
Woodbridge	920	2	5	--	7	7.6	6	1	---	---	---	---	5	---	---	---	--	5	---	---	7	10	--	17	17	---	--	18.4
Total	204,960	2901	2758	19	5678	27.7	2143	2208	511	374	207	235	905	543	147	153	--	1748	99	78	1769	1607	7	3383	2491	854	38	16.5

* Deaths of non-residents in public institutions: New Haven, 59; deducted from total in estimating death-rate.
† N. B.—The Town of Ansonia was set off from Derby by Act of Legislature, April 17, 1889.

TABLE II.—NEW LONDON COUNTY.

TOWNS.	Estimated Population.	BIRTHS. Sex. Male.	Female.	Not stated.	Total.	Birth-rate per 1,000.	Parentage. Both Amer.	Both Foreign.	Am. Mother, For. Father.	Am. Father, For. Mother.	Both For. of diff. Nations.	Not stated.	MARRIAGES. Nativity. Both Amer.	Both Foreign.	Husb. Amer. Wife Foreign.	Husb. Foreign. Wife Amer.	Not stated.	Total.	Husband non-resident.	Both non-resident.	DEATHS. Sex. Male.	Female.	Not stated.	Total.	Nativity. American.	Foreign.	Not stated.	Death-rate per 1000.
New London	13,500	147	147	--	294	21.8	150	90	24	21	9	---	94	32	13	12	--	151	21	3	130	125	--	255	216	39	--	18 8
Bozrah	1,000	7	6	--	13	13.0	7	3	---	3	---	---	6	2	---	---	--	8	---	---	5	3	--	8	5	3	--	8.0
Colchester	2,990	36	25	--	61	20.4	37	16	6	2	--	---	16	5	2	1	--	24	3	---	28	20	--	48	41	7	--	16.0
East Lyme	2,000	25	18	1	44	22.0	22	18	---	2	2	---	10	3	1	1	--	15	---	---	22	17	1	40	38	2	--	20.0
Franklin	590	4	---	--	4	6.7	4	---	---	---	---	---	3	---	---	---	--	3	---	---	10	6	--	16	16	---	--	27.1
Griswold	3,110	27	32	1	60	19.2	26	22	3	7	---	2	5	14	4	---	1	24	1	---	29	33	--	62	51	9	2	19.9
Groton	5,470	43	44	--	87	15.9	69	6	4	6	2	---	26	---	1	1	--	28	5	2	42	48	-	90	85	5	--	16.4
Lebanon	1,680	12	14	1	27	16.0	23	2	2	---	---	---	10	---	1	---	--	11	2	---	10	11	--	21	17	3	1	12.5
Ledyard	1,200	6	5	--	11	9.1	10	1	---	---	---	---	5	---	---	---	--	5	---	---	12	6	--	18	16	2	--	15.0
Lisbon	550	7	7	--	14	25 4	8	---	---	5	---	1	5	---	---	---	--	5	---	---	5	5	--	10	7	3	-	18.1
Lyme	980	3	4	--	7	7.1	7	---	---	---	---	---	8	---	---	---	--	8	---	---	4	4	--	8	8	--	--	8.3
Montville	2,350	25	21	--	46	19.5	27	14	1	2	2	---	9	4	1	3	--	17	1	1	25	18	--	43	39	4	--	18.3
Norwich	22,900	271	254	--	525	22.9	199	207	51	39	29	---	88	50	16	17	--	171	14	3	152	178	--	330	227	101	2	14.4
No. Stonington	1,460	11	6	5	22	15.0	19	---	---	3	---	---	8	---	---	1	--	9	2	---	13	13	1	27	24	---	3	18.4
Old Lyme	1,320	12	10	--	22	16.6	19	---	1	2	---	---	8	---	---	1	--	9	---	---	10	6	--	16	16	---	--	12.1
Preston	2,550	22	29	--	51	20.0	35	11	3	---	2	---	7	2	2	4	--	15	3	---	20	13	--	33	23	10	--	12.9
Salem	490	2	6	--	8	16.3	7	---	---	1	---	---	4	---	---	1	--	5	---	---	1	1	--	2	2	---	--	4.0
Sprague	1,000	13	18	--	31	31.0	10	10	3	5	3	---	---	3	---	---	--	3	---	---	8	7	--	15	8	7	--	15.0
Stonington	7,350	67	70	--	137	18.6	90	27	9	8	3	---	38	5	1	5	--	49	9	4	70	60	--	130	96	34	--	17.6
Voluntown	1,060	18	12	--	30	28.3	15	14	---	1	---	---	6	5	---	1	--	12	2	---	13	15	--	28	24	4	--	26.4
Waterford	2,660	20	21	--	41	15.4	27	8	---	2	4	---	10	2	1	1	--	14	1	---	35	20	--	55	51	4	--	20.5
Total	76,210	778	749	8	1535	20.1	811	449	107	109	56	3	366	127	43	49	1	586	64	13	644	609	2	1255	1010	237	8	16.4

TABLE II.—FAIRFIELD COUNTY.

TOWNS.	Estimated Population.	BIRTHS. Sex. Male.	Female.	Not stated.	Total.	Birth-rate per 1,000.	Parentage. Both Amer.	Both Foreign.	Am. Mother, For. Father.	Am. Father, For. Mother.	Both For. of diff. Nations.	Not stated.	MARRIAGES. Nativity. Both Amer.	Both Foreign.	Hub. Amer. Wife Foreign.	Hush. Foreign. Wife Amer.	Not stated.	Total.	Husband non-resident.	Both non-resident.	DEATHS. Sex. Male.	Female.	Not stated.	Total.	Nativity. American.	Foreign.	Not stated.	Death-rate per 1000.
Danbury	18,900	266	275	6	547	28.4	278	163	56	35	7	8	69	28	6	14	..	117	7	5	195	136	1	332	243	63	26	17.5
Bridgeport	47,800	615	568	5	1188	24.8	505	439	107	90	47	...	230	158	49	46	..	483	33	13	459	392	..	851*	616	220	15	17.4
Bethel	3,350	41	36	..	77	23.0	47	15	3	9	1	2	12	...	2	...	1	15	1	...	24	21	..	45	34	9	2	13.4
Brookfield	1,000	11	9	..	20	20.0	13	7	...	...	...	...	3	...	...	...	..	3	...	...	7	9	..	16	16	...	..	16.0
Darien	2,250	18	21	..	39	17.3	24	9	4	1	...	1	11	3	1	...	..	15	3	2	36	19	..	55*	45	10	..	19.1
Easton	1,000	7	4	..	11	11.0	9	1	...	1	...	...	7	...	...	...	..	7	...	...	9	10	..	19	19	...	..	19.0
Fairfield	3,860	28	29	1	58	15.0	37	8	5	4	4	...	19	3	3	6	..	31	...	...	28	40	..	68	51	16	1	17.6
Greenwich	10,000	84	78	..	162	16.2	86	46	4	14	12	...	28	6	5	7	..	46	13	2	76	78	..	154	117	37	..	15.4
Huntington	3,850	56	34	2	92	23.8	43	24	8	10	5	2	13	2	6	1	1	23	...	...	35	34	..	69	53	14	2	17.9
Monroe	1,000	4	7	..	11	11.0	7	4	...	...	...	...	3	2	2	...	..	7	...	...	12	13	..	25	24	1	..	25.0
New Canaan	2,690	32	19	..	51	18.9	36	4	5	4	2	...	12	1	...	...	..	13	3	...	13	21	..	34	31	3	..	12.6
New Fairfield	680	3	6	..	9	13.2	9	...	...	...	...	...	...	...	...	1	..	1	1	...	6	4	..	10	10	...	..	14.7
Newtown	3,500	30	25	..	55	15.7	27	19	4	4	1	...	16	6	3	...	..	25	3	...	33	42	..	75	53	22	..	21.4
Norwalk	17,400	198	183	..	381	21.8	229	98	18	34	2	...	73	22	12	22	..	129	8	3	140	126	..	266	209	57	..	15.2
Redding	1,540	18	11	..	29	18.8	20	3	3	2	1	...	13	...	...	1	..	14	...	...	14	15	..	29	28	1	..	18.8
Ridgefield	2,200	18	20	..	38	18.1	31	...	3	3	1	...	15	1	...	...	..	16	5	...	19	21	..	40	35	5	..	18.1
Sherman	680	8	6	..	14	20.5	10	4	...	...	...	...	2	...	...	1	..	3	...	...	3	2	..	5	4	1	.	7.3
Stamford	15,000	221	196	1	418	27.8	187	134	34	44	17	2	49	19	5	12	..	85	22	8	133	152	..	285	221	55	9	19.0
Stratford	2,600	39	24	..	63	24.2	40	13	1	6	3	...	11	...	...	1	..	12	1	...	35	35	..	70	56	14	..	26.9
Trumbull	1,450	9	7	1	17	11.7	15	...	2	...	...	...	10	...	...	1	..	11	1	...	11	11	..	22	20	2	..	15.1
Weston	780	12	7	..	19	24.3	15	4	..	...	...	...	...	...	...	...	..	...	...	...	11	8	..	19	18	1	..	24.3
Westport	3,700	32	35	..	67	18.1	34	22	5	4	2	...	21	4	...	...	..	25	...	...	37	28	..	65	53	12	..	17.5
Wilton	1,730	16	10	..	26	15.0	15	7	3	1	...	...	6	1	...	...	..	7	...	1	18	11	..	29	24	5	..	16.7
Total	146,960	1766	1610	16	3392	23.0	1717	1024	265	266	105	15	623	256	94	113	2	1088	101	34	1354	1228	1	2583	1980	548	55	17.5

* Deaths of non-residents in public institutions: Bridgeport, 15; Darien, 12; deducted from total in estimating death-rate.

TABLE II.—WINDHAM COUNTY.

TOWNS.	Estimated Population.	BIRTHS. Sex. Male.	Female.	Not stated.	Total.	Birth rate per 1,000.	Parentage. Both Amer.	Both Foreign.	Am. Mother, For. Father.	Am. Father, For. Mother.	Both For. of diff. Nations.	Not stated.	MARRIAGES. Nativity. Both Amer.	Both Foreign.	Husb. Amer., Wife Foreign.	Husb. Foreign, Wife Amer.	Not stated.	Total.	Husband non-resident.	Both non-resident.	DEATHS. Sex. Male.	Female.	Not stated.	Total.	Nativity. American.	Foreign.	Not stated.	Death-rate per 1,000.
Brooklyn	2,600	22	18	--	40	15.3	18	21	---	---	1	---	8	7	---	1	--	16	---	---	28	10	--	38	27	11	--	14.6
Ashford	790	4	4	--	8	10.1	8	---	---	---	---	---	2	---	---	---	--	2	---	---	10	8	--	18	17	1	--	22.7
Canterbury	960	3	2	--	5	5.2	5	---	---	---	---	---	2	---	1	1	--	4	1	---	6	4	--	10	10	---	--	10.4
Chaplin	550	6	5	--	11	20.0	11	---	---	---	---	---	7	---	---	1	--	8	3	2	5	3	--	8	8	---	--	14.5
Eastford	580	7	12	--	19	32.7	19	---	---	---	---	---	2	---	---	1	--	3	---	---	2	7	--	9	9	---	--	15.5
Hampton	650	2	5	--	7	10.7	5	1	1	---	---	---	2	---	1	---	--	3	---	---	8	5	--	13	12	1	--	20.0
Killingly	7,030	103	93	--	196	27.8	96	73	12	9	4	2	26	24	2	5	--	57	7	2	55	84	--	139	113	15	11	19.7
Plainfield	4,570	47	48	--	95	20.7	33	40	11	9	2	---	9	12	7	5	--	33	4	1	38	32	--	70	61	9	--	15.3
Pomfret	1,490	14	10	1	25	16.7	15	5	1	1	1	2	9	---	1	---	--	10	3	---	16	19	--	35	30	5	--	23.4
Putnam	6,440	86	91	2	179	27.7	48	92	23	11	2	3	26	14	5	11	--	56	4	2	63	82	--	145	118	26	1	22.5
Scotland	500	5	4	--	9	18.0	9	---	---	---	---	---	2	---	---	---	--	2	---	---	10	6	--	16	14	2	--	32.0
Sterling	1,040	3	8	--	11	10.5	6	5	---	---	---	---	17	---	---	---	--	17	3	2	8	7	--	15	14	1	--	14.4
Thompson	5,600	50	44	8	102	18.2	12	61	2	8	10	9	14	15	3	10	--	42	---	---	51	56	2	109	74	28	7	19.4
Windham	9,900	136	106	--	242	24.4	94	94	25	20	7	2	57	13	12	6	3	91	9	1	73	89	--	162	117	41	4	16.3
Woodstock	2,300	15	18	--	33	14.3	28	4	---	1	---	---	11	1	1	---	--	13	1	---	28	27	--	55	49	6	--	23.9
Total	45,000	503	468	11	982	21.8	407	396	75	59	27	18	194	86	33	41	3	357	35	10	401	439	2	842	673	146	23	18.7

TABLE II.—LITCHFIELD COUNTY.

TOWNS.	Estimated Population.	BIRTHS. Sex. Male.	Female.	Not stated.	Total.	Birth-rate per 1,000.	Parentage. Both Amer.	Both Foreign.	Am. Mother, For. Father.	Am. Father, For. Mother.	Both For. of diff. Nations.	Not stated.	MARRIAGES. Nativity. Both Amer.	Both Foreign.	Husb. Amer., Wife Foreign.	Husb. Foreign, Wife Amer.	Not stated.	Total.	Husband non-resident.	Both non-resident.	DEATHS. Sex. Male.	Female.	Not stated.	Total.	Nativity. American.	Foreign.	Not stated.	Death-rate per 1,000.
Litchfield	3,300	30	21	--	51	15.4	30	12	2	5	2	---	14	2	1	1	--	18	1	---	27	22	--	49	36	13	--	14.8
Barkhamsted	1,130	8	7	1	16	14.1	14	2	---	---	---	---	4	1	---	---	--	5	---	---	11	12	1	24	18	2	4	21.2
Bethlehem	540	7	7	--	14	25.9	12	---	1	---	---	1	2	---	---	---	--	2	---	---	4	4	--	8	8	---	--	14.8
Bridgewater	620	8	1	--	9	14.5	7	1	--	1	---	---	2	---	---	---	--	2	---	---	9	5	--	14	14	---	--	22.5
Canaan	970	15	13	--	28	28.8	22	3	3	---	---	---	8	---	---	---	--	8	---	---	11	11	--	22	21	1	--	22.6
Colebrook	1,100	9	8	--	17	15.4	12	3	2	---	---	---	2	1	---	1	--	4	1	1	13	13	--	26	25	1	--	23.6
Cornwall	1,280	9	9	--	18	14.0	16	1	---	1	---	---	5	1	---	---	--	6	---	1	6	7	--	13	10	3	--	10.1
Goshen	980	10	8	--	18	18.3	13	3	---	1	1	---	4	---	---	---	--	4	---	---	4	5	--	9	9	---	--	9.1
Harwinton	940	6	8	--	14	14.8	11	2	---	1	---	---	4	---	---	---	--	4	---	---	8	7	--	15	13	2	--	15.9
Kent	1,380	19	9	--	28	20.2	27	---	1	---	---	---	3	---	---	---	--	3	---	---	8	13	--	21	17	4	--	15.2
Morris	590	5	2	--	7	11.8	5	---	1	---	1	---	1	---	2	---	--	3	---	---	5	3	--	8	5	3	--	13.5
New Hartford	3,160	42	32	2	76	24.0	35	38	2	1	---	---	10	9	1	2	--	22	2	---	27	31	1	59	44	15	--	18.6
New Milford	3,930	36	43	1	80	20.3	62	7	6	3	1	1	19	7	1	---	--	27	1	---	29	26	--	55	39	8	8	14.0
Norfolk	1,530	11	12	2	25	16.3	24	1	---	---	---	---	6	---	---	1	--	7	1	---	8	9	3	20	16	4	--	13.0
North Canaan	1,650	21	15	--	36	21.8	27	7	1	1	---	---	11	1	1	---	--	13	---	2	7	11	--	18	15	3	--	10.9
Plymouth	2,150	20	23	--	43	20.0	22	14	4	2	1	---	13	2	1	---	--	16	3	5	15	10	--	25	14	11	--	11.5
Roxbury	930	8	9	--	17	18.2	7	5	3	---	1	1	3	1	---	---	--	4	---	---	13	13	--	26	24	2	--	27.9
Salisbury	3,430	38	30	--	68	19.8	38	15	9	4	1	1	10	1	---	2	--	13	3	---	33	20	--	53	32	11	10	15.4
Sharon	2,150	30	13	--	43	20.0	31	6	4	1	1	---	6	2	---	1	--	9	---	---	17	17	--	34	28	6	--	15.8
Thomaston	3,270	40	39	--	79	24.1	38	26	8	5	2	---	16	11	3	9	--	39	1	---	22	24	--	46	29	17	--	14.0
Torrington	5,800	46	42	--	88	15.2	47	25	5	6	5	---	19	12	6	2	--	39	1	---	44	20	--	64	48	16	--	11.0
Warren	490	5	1	--	6	12.2	3	3	---	---	---	---	2	---	---	---	--	2	---	---	4	9	--	13	10	3	--	26.5
Washington	1,630	18	17	--	35	21.4	16	15	3	1	---	---	3	5	1	---	--	9	---	---	9	10	--	19	18	1	--	11.6
Watertown	2,300	27	23	--	50	21.7	30	12	1	6	1	---	15	3	4	---	--	22	1	---	14	20	--	34	27	7	--	14.7
Winchester	6,060	51	54	1	106	17.4	65	22	9	7	3	---	29	20	4	2	--	55	3	2	43	35	--	78	62	16	--	12.8
Woodbury	1,820	15	16	--	31	17.0	25	4	1	1	---	---	6	---	2	1	--	9	1	---	7	14	--	21	18	3	--	11.5
Total	53,130	534	462	7	1003	18.8	639	227	66	47	20	4	217	79	27	22	--	345	19	11	398	371	5	774	600	152	22	14.5

TABLE II.—MIDDLESEX COUNTY.

TOWNS.	Estimated Population.	BIRTHS. Sex. Male.	Female.	Not stated.	Total.	Birth-rate per 1,000.	Parentage. Both Amer.	Both Foreign.	Am. Mother, For. Father.	Am. Father, For. Mother.	Both For. of diff. Nations.	Not stated.	MARRIAGES. Nativity. Both Amer.	Both Foreign.	Husb. Amer., Wife Foreign.	Husb. Foreign, Wife Amer.	Not stated.	Total.	Husband non-resident.	Both non-resident.	DEATHS. Sex. Male.	Female.	Not stated.	Total.	Nativity. American.	Foreign.	Not stated.	Death-rate per 1,000.
Middletown	14,600	158	140	2	300	20.5	140	99	32	23	5	1	60	18	11	9	--	98	8	1	134	162	--	296*	189	94	13	13.8
Haddam	2,070	24	38	--	62	29.9	40	15	4	1	2	---	16	2	---	3	--	21	1	---	22	17	--	39	30	7	2	18.8
Chatham	1,950	13	13	-	26	13.3	19	2	1	2	2	---	8	---	---	1	--	9	2	2	14	18	--	32	27	4	1	16.9
Chester	1,280	13	11	--	24	18.7	11	8	3	2	---	---	8	---	1	---	--	9	---	---	5	10	--	15	14	1	--	11.7
Clinton	1,390	13	12	--	25	18.1	21	4	---	---	---	---	6	---	---	---	--	6	1	---	12	9	--	21	20	1	--	15.1
Cromwell	1,860	14	11	--	25	13.4	8	13	1	2	1	---	3	2	2	---	--	7	---	---	22	14	--	36	27	9	--	19.3
Durham	860	9	7	2	18	20.9	15	1	1	1	---	---	2	---	---	---	--	2	---	---	6	4	1	11	10	1	--	12.7
East Haddam	2,550	19	23	--	42	16.4	31	2	3	3	3	---	15	---	1	---	--	16	4	---	19	33	--	52	48	4	--	20.3
Essex	2,020	14	9	--	23	11.3	19	1	1	2	---	---	16	1	1	---	--	18	2	1	18	13	3	34	31	3	--	16.8
Killingworth	600	6	2	--	8	13.2	8	---	---	---	---	---	5	---	---	---	--	5	---	---	5	6	--	11	10	1	--	18.3
Middlefield	990	14	7	--	21	21.1	14	---	2	4	1	---	4	---	---	---	--	4	---	---	9	7	--	16	11	5	--	16.1
Old Saybrook	1,460	11	19	--	30	20.5	20	5	---	4	1	---	6	---	---	1	--	7	---	1	19	11	--	30	29	1	--	20.5
Portland	4,630	80	77	--	157	33.9	26	112	14	2	3	---	17	36	1	3	--	57	2	2	50	45	--	95	69	26	--	20.5
Saybrook	1,470	5	20	--	25	17.0	17	4	2	2	---	---	15	4	---	1	--	20	---	---	7	9	--	16	15	1	--	10.8
Westbrook	870	7	7	--	14	16.0	13	---	1	---	---	---	5	---	---	---	--	5	---	---	6	11	--	17	17	---	--	19.5
Total	38,600	400	396	4	800	20.7	402	266	65	48	18	1	186	63	17	18	--	284	20	7	348	369	4	721	547	158	16	18.6

* Deaths of non-residents in public institutions: Middletown, 94; deducted from total in estimating death-rate.

TABLE II.—TOLLAND COUNTY.

TOWNS.	Estimated Population.	BIRTHS. Sex. Male.	Female.	Not stated.	Total.	Birth-rate per 1,000.	Parentage. Both Amer.	Both Foreign.	Am. Mother, For. Father.	Am. Father, For. Mother.	Both For. of diff. Nations.	Not stated.	MARRIAGES. Nativity. Both Amer.	Both Foreign.	Husb. Amer., Wife Foreign.	Husb. Foreign, Wife Amer.	Not stated.	Total.	Husband non-resident.	Both non-resident.	DEATHS. Sex. Male.	Female.	Not stated.	Total.	Nativity. American.	Foreign.	Not stated.	Death-rate per 1,000.
Tolland	1,050	9	13	2	24	22.8	21	2	1	---	---	---	8	---	--	1	--	9	2	---	6	9	--	15	13	---	2	14.2
Andover	400	7	3	--	10	25.0	8	---	2	---	---	---	2	---	---	---	--	2	---	---	3	6	--	9	9	---	--	22.5
Bolton	460	2	---	--	2	4.3	1	1	---	---	---	---	6	---	---	---	--	6	2	1	2	5	--	7	7	---	--	15.2
Columbia	740	9	9	--	18	24.4	10	6	---	---	2	---	3	---	---	---	--	3	---	---	8	7	--	15	14	1	--	20.2
Coventry	1,890	26	13	--	39	20.6	26	8	5	---	---	--	7	3	3	---	--	13	3	---	16	11	--	27	26	1	--	14.5
Ellington	1,520	10	10	--	20	13.1	5	7	5	3	---	---	16	---	---	---	--	16	2	---	9	8	--	17	12	5	--	11.1
Hebron	1,050	11	10	--	21	20.0	15	3	2	1	---	---	8	---	---	---	--	8	---	---	13	2	--	15	13	2	--	14.2
Mansfield	1,950	12	13	--	25	12.8	19	1	4	1	---	---	14	---	---	---	--	14	4	1	14	8	--	22	18	4	--	11.2
Somers	1,400	14	17	3	34	24.3	27	3	1	3	---	---	3	3	---	1	--	7	---	---	15	13	--	28	25	3	--	20.0
Stafford	4,520	60	45	2	107	23.6	50	29	14	9	5	---	34	10	5	5	--	54	11	4	35	30	--	65	50	15	--	14.3
Union	440	5	4	--	9	20.4	8	---	1	---	--	---	2	---	---	---	--	2	---	---	8	9	--	17	16	1	--	38.6
Vernon	8,700	119	107	--	226	26.0	90	88	21	17	8	2	30	21	10	12	1	74	10	1	95	64	3	162	107	51	4	18.6
Willington	920	10	10	--	20	21.7	11	1	3	5	---	---	5	2	---	---	--	7	1	---	13	2	--	15	13	2	--	16.3
Total	25,040	294	254	7	555	22.1	291	149	59	39	15	2	138	39	18	19	1	215	35	7	237	174	3	414	323	85	6	16.5

TABLE III.—RECAPITULATION BY COUNTIES.

COUNTIES	Estimated Population.	BIRTHS. Sex. Male.	Female.	Not stated.	Total.	Birth-rate per 1,000.	Parentage. Both American.	Both Foreign.	Am. Mother, For. Father.	Am. Father, For. Mother.	Both For. of diff. Nations.	Not stated.	MARRIAGES. Nativity. Both American.	Both Foreign.	Husb. Amer., Wife Foreign.	Husb. Foreign, Wife American.	Not stated.	Total.	Husband non-resident.	Both non-resident.	DEATHS. Sex. Male.	Female.	Not stated.	Total.	Nativity. American.	Foreign.	Not stated.	Death-rate per 1,000.
HARTFORD	144,100	1743	1466	22	3231	22.4	1421	1102	294	237	92	85	648	292	78	99	4	1121	117	65	1310	1245	2	2557	1863	682	12	17.7
New Haven	204,960	2901	2758	19	5678	27.7	2143	2208	511	374	207	235	905	543	147	153	..	1748	99	78	1769	1607	7	3383	2491	854	38	16.5
New London	76,210	778	749	8	1535	20.1	811	449	107	109	56	3	366	127	43	49	1	586	64	13	644	609	2	1255	1010	237	8	16.4
Fairfield	146,960	1766	1610	16	3392	23.0	1717	1024	265	266	105	15	623	256	94	113	2	1088	101	34	1354	1228	1	2583	1980	548	55	17.5
Windham	45,000	503	468	11	982	21.8	407	396	75	59	27	18	194	86	33	41	3	357	35	10	401	439	2	842	673	146	23	18.7
Litchfield	53,130	534	462	7	1003	18.8	639	227	66	47	20	4	217	79	27	22	..	345	19	11	398	371	5	774	600	152	22	14.5
Middlesex	38,600	400	396	4	800	20.7	402	266	65	48	18	1	186	63	17	18	..	284	20	7	348	369	4	721	547	158	16	18.6
Tolland	25,040	294	254	7	555	22.1	291	149	59	39	15	2	138	39	18	19	1	215	35	7	237	174	3	414	323	85	6	16.5
Total	734,000	8919	8163	94	17176	23.4	7831	5821	1442	1179	540	363	3277	1485	457	514	11	5744	490	225	6461	6042	26	12529	9487	2862	180	17.0

TABLE IV.

EXHIBITING THE NUMBER OF BIRTHS, BY SEXES, IN THE SEVERAL COUNTIES FOR EACH MONTH IN THE YEAR ENDING DECEMBER 31, 1889.

COUNTIES.	SEX.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
Hartford	Male	142	139	149	143	144	138	169	148	130	152	144	145	1,743
	Female	110	105	135	114	111	127	156	136	142	106	109	115	1,466
	Not stated	1	----	----	2	2	1	5	4	2	1	4	----	22
		253	244	284	259	257	266	330	288	274	259	257	260	3,231
New Haven	Male	261	225	229	237	248	246	259	270	231	240	238	217	2,901
	Female	222	229	258	211	205	231	251	234	227	239	235	216	2,758
	Not stated	4	2	2	----	----	1	----	3	2	2	1	2	19
		487	456	489	448	453	478	510	507	460	481	474	435	5,678
New London	Male	81	66	66	70	47	59	63	79	60	61	60	66	778
	Female	52	66	68	54	67	68	68	73	62	62	58	51	749
	Not stated	2	----	2	3	1	----	----	----	----	----	----	----	8
		135	132	136	127	115	127	131	152	122	123	118	117	1,535
Fairfield	Male	152	145	142	141	152	138	183	148	146	160	144	115	1,766
	Female	155	115	105	111	114	131	144	162	133	156	138	146	1,610
	Not stated	2	2	1	----	1	1	2	----	----	3	1	3	16
		309	262	248	252	267	270	329	310	279	319	283	264	3,392
Windham	Male	39	42	59	39	40	46	46	41	46	39	36	30	503
	Female	34	36	43	39	40	34	56	45	35	28	32	46	468
	Not stated	----	----	3	1	1	1	----	2	----	3	----	----	11
		73	78	105	79	81	81	102	88	81	70	68	76	982
Litchfield	Male	45	37	59	45	46	41	47	41	41	44	50	38	534
	Female	37	30	44	36	41	48	38	45	35	34	41	33	462
	Not stated	1	----	1	1	2	----	----	----	1	1	----	----	7
		83	67	104	82	89	89	85	86	77	79	91	71	1,003
Middlesex	Male	24	27	34	37	29	27	44	37	30	48	26	37	400
	Female	28	40	30	34	27	27	40	29	37	45	30	29	396
	Not stated	----	----	----	----	----	----	1	----	----	2	1	----	4
		52	67	64	71	56	54	85	66	67	95	57	66	800
Tolland	Male	29	27	24	25	28	28	19	25	20	30	23	16	294
	Female	15	12	22	27	20	22	18	25	27	21	27	18	254
	Not stated	----	----	1	1	----	----	----	1	1	----	2	1	7
		44	39	47	53	48	50	37	51	48	51	52	35	555
Totals	Male	773	708	762	737	734	723	830	789	704	774	721	664	8,919
	Female	653	633	705	626	625	688	771	749	698	691	670	654	8,163
	Not stated	10	4	10	8	7	4	8	10	6	12	9	6	94
Grand Total		1436	1345	1477	1371	1366	1415	1609	1548	1408	1477	1400	1324	17,176

TABLE V.

EXHIBITING THE NUMBER OF DEATHS, BY SEXES, IN THE SEVERAL COUNTIES FOR EACH MONTH IN THE YEAR ENDING DECEMBER 31, 1889.

COUNTIES.	SEX.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Mo. not stat.	Total.
Hartford	Male	84	118	91	143	85	104	142	117	121	104	97	104	--	1,310
	Female	78	91	106	111	105	83	158	111	116	107	83	96	--	1,245
	Not stated	----	----	1	----	----	--	----	----	1	----	----	----	--	2
		162	209	198	254	190	187	300	228	238	211	180	200	--	2,557
New Haven	Male	126	148	155	170	120	154	197	154	143	148	118	136	--	1,769
	Female	137	130	127	142	114	120	185	155	122	128	125	122	--	1,607
	Not stated	----	----	----	1	----	1	2	----	1	1	1	----	--	7
		263	278	282	313	234	275	384	309	266	277	244	258	--	3,383
New London	Male	40	46	81	51	51	53	52	62	57	48	57	46	--	644
	Female	49	52	54	61	35	39	55	73	54	53	40	44	--	609
	Not stated	----	----	1	----	----	----	----	----	----	----	1	----	--	2
		89	98	136	112	86	92	107	135	111	101	98	90	--	1,255
Fairfield	Male	104	88	108	100	108	108	181	144	99	118	104	92	--	1,354
	Female	79	94	115	92	108	87	117	115	109	113	85	114	--	1,228
	Not stated	----	----	----	----	----	----	1	----	----	----	----	----	--	1
		183	182	223	192	216	195	299	259	208	231	189	206	--	2,583
Windham	Male	25	30	37	30	29	35	46	39	42	37	24	27	--	401
	Female	26	24	47	33	39	30	47	46	36	42	37	32	--	439
	Not stated	1	----	----	----	----	----	----	----	----	----	----	1	--	2
		52	54	84	63	68	65	93	85	78	79	61	60	--	842
Litchfield	Male	37	28	38	41	37	28	38	35	30	31	26	29	--	398
	Female	27	26	26	41	22	23	32	37	44	29	30	34	--	371
	Not stated	1	----	1	1	----	----	----	----	----	----	1	----	1	5
		65	54	65	83	59	51	70	72	74	60	57	63	1	774
Middlesex	Male	34	25	28	26	27	25	31	38	33	30	29	22	--	348
	Female	30	21	31	29	38	20	40	35	26	27	35	37	--	369
	Not stated	1	----	---	----	----	----	1	1	----	1	----	----	--	4
		65	46	59	55	65	45	72	74	59	58	64	59	--	721
Tolland	Male	20	22	17	15	20	18	26	26	22	21	14	16	--	237
	Female	13	13	12	14	19	16	15	16	18	15	10	13	--	174
	Not stated	----	----	----	----	----	2	1	----	----	----		----	--	3
		33	35	29	29	39	36	42	42	40	36	24	29	--	414
Totals	Male	470	505	555	576	477	525	713	615	547	537	469	472	--	6,461
	Female	439	451	518	523	480	418	649	588	525	514	445	492	--	6,042
	Not stated	3	----	3	2	----	3	5	1	2	2	3	1	1	26
Grand Total		912	956	1076	1101	957	946	1367	1204	1074	1053	917	965	1	12,529

TABLE VI

EXHIBITS THE NUMBER OF DEATHS IN EACH TOWN FROM THE DIFFERENT CAUSES, NOSOLOGICALLY ARRANGED BY CLASSES AND ORDERS. HARTFORD COUNTY.

CAUSES OF DEATH.	State.	Hartford.	Avon.	Berlin.	Bloomfield.	Bristol.	Burlington.	Canton.	East Granby.	East Hartford.	East Windsor.	Enfield.	Farmington.	Glastonbury.	Granby.	Hartland.	Manchester.	Marlborough.	New Britain.	Newington.	Plainville.	Rocky Hill.	Simsbury.	Southington.	South Windsor.	Suffield.	West Hartford.	Wethersfield.	Windsor.	Windsor Locks.	Total.
CLASS I.—Zymotic Diseases.																															
ORDER 1. MIASMATIC.																															
Chicken Pox	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Measles	62	7	--	--	--	--	--	--	--	--	1	--	--	--	--	--	5	--	7	--	1	--	--	--	--	--	--	--	--	--	21
Scarlet Fever	81	2	--	--	--	--	--	--	--	--	--	1	--	--	--	--	1	--	2	--	3	--	--	--	--	--	1	--	--	--	10
Typhus Fever	8	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Relapsing Fever	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Influenza	4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	1
Typhoid Fever	281	26	--	1	--	4	--	2	--	1	--	5	2	--	--	--	1	--	10	--	--	--	--	1	1	2	--	--	3	3	62
Cerebro-Spinal Fever	40	6	--	--	--	--	--	--	--	1	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	9
Continued Fever	37	13	--	--	--	--	--	--	--	--	1	--	--	--	--	--	2	--	--	--	--	--	1	1	--	--	--	--	--	--	18
Whooping Cough	92	10	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	3	--	--	--	--	--	--	--	--	--	2	--	16
Diphtheria	584	107	--	1	4	1	1	2	--	11	1	2	--	8	--	--	2	--	6	--	1	--	--	4	4	--	5	--	2	3	165
Membranous Croup	133	9	--	--	--	1	--	--	--	--	--	--	--	2	--	--	4	--	7	--	--	--	--	--	--	1	--	--	1	--	25
Other Miasmatic Diseases	32	--	--	1	--	--	1	--	--	--	--	--	--	--	--	--	--	--	13	--	--	--	--	--	--	--	--	--	--	--	15

ORDER 2. DIARRHŒAL.																													
Cholera Infantum	506	--	1	--	--	3	1	1	--	2	3	7	2	--	--	--	5	2	23	1	--	1	--	3	--	1	2	2	3	4	67
Infantile Diarrhœa	257	50	--	--	--	--	--	1	--	--	--	--	--	--	--	--	3	1	10	--	2	--	--	1	--	--	--	--	1	3	72
Cholera Morbus	36	12	--	--	--	--	--	--	--	--	1	--	--	--	--	--	1	--	--	1	--	--	--	--	--	--	--	1	1	--	17
Dysentery	146	3	--	3	3	2	--	--	--	1	--	2	--	--	2	--	2	--	26	--	4	--	--	1	1	--	--	1	--	--	51
Diarrhœa	54	--	--	--	--	--	1	--	--	--	1	--	--	1	1	--	--	--	1	--	1	--	--	--	--	--	--	--	--	--	6
ORDER 3. MALARIAL.																															
Intermittent Fever	21	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	2
Remittent Fever	30	1	--	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	1	--	--	--	--	--	--	5
Pernicious or Congestive Fever	17	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	2	--	--	--	1	--	--	6
Other Malarial Diseases	49	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	2	--	--	--	--	--	--	3
ORDER 4. ZOOGENOUS.																															
Hydrophobia	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cow Pox and effects of Vaccination	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ORDER 5. VENEREAL.																															
Syphilis	4	1	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2
Gonorrhœa, Stricture of Urethra	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Venereal Diseases	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ORDER 6. SEPTIC.																															
Erysipelas	22	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2
Pyæmia, Septicæmia	51	2	--	1	--	--	1	--	--	--	--	1	--	--	--	--	--	--	--	1	1	--	--	1	--	1	--	--	1	--	10
Puerperal Fever	49	3	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	2	--	--	--	--	--	1	--	--	--	--	--	7
CLASS II.—Parasitic Diseases.																															
Thrush	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Parasitic Diseases	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
CLASS III.—Dietetic Diseases.																															
Intemperance	25	6	--	--	--	1	--	--	--	3	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	11
Chronic Alcoholism	23	--	--	--	--	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2
Delirium Tremens	9	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2

TABLE VI.—CONTINUED. HARTFORD COUNTY.

CAUSES OF DEATH.	State.	Hartford.	Avon.	Berlin.	Bloomfield.	Bristol.	Burlington.	Canton.	East Granby.	East Hartford.	East Windsor.	Enfield.	Farmington.	Glastonbury.	Granby.	Hartland.	Manchester.	Marlborough.	New Britain.	Newington.	Plainville.	Rocky Hill.	Simsbury.	Southington.	South Windsor.	Suffield.	West Hartford.	Wethersfield.	Windsor.	Windsor Locks.	Total.
CLASS IV.—Constitutional Diseases.																															
Rheumatism	103	7	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	2	--	--	--	1	11
Gout	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Rickets	5	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2
Cancer of Breast	38	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	1	--	--	--	--	--	--	4
Cancer of Stomach	69	5	--	--	--	--	--	2	1	--	--	--	--	--	--	--	--	--	2	--	--	--	--	1	--	--	--	--	1	--	12
Cancer of Womb	49	2	--	--	--	--	--	--	--	--	--	2	1	--	1	--	--	--	2	--	--	--	1	--	--	--	--	--	--	--	9
Cancer of other organs	168	12	--	1	--	2	--	3	--	--	1	2	1	--	--	--	3	--	1	--	--	--	--	1	--	1	1	1	--	--	30
Tabes Mesenterica	75	--	--	--	--	1	--	--	--	--	--	--	1	--	--	--	--	--	3	1	--	1	--	--	--	1	--	--	1	--	9
Tubercular Meningitis, Acute Hydroceph.	81	5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	3	--	--	--	1	1	--	--	1	--	--	6	18
Phthisis	1459	132	--	2	--	8	4	11	--	7	4	22	2	7	2	1	16	--	39	1	4	1	--	4	4	1	--	4	4	5	285
Other forms of Tuberculosis	59	--	--	--	--	--	--	1	--	--	--	2	--	--	--	--	--	--	--	--	1	--	--	--	--	--	2	--	--	--	6
Scrofula	25	5	--	--	--	1	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7
Pott's Disease	3	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	2
Hip-Joint Disease	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	1
Purpura	3	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1
Anæmia	23	1	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2
Diabetes	48	2	--	--	--	--	--	--	--	--	--	2	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	5
Other Constitutional Diseases	8	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

CLASS V.—Developmental Diseases.																														
Premature Birth	217	14	--	--	--	--	--	--	--	3	--	--	1	2	--	--	1	--	10	--	--	--	--	2	2	3	--	--	--	38
Atelectasis	19	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	1	3
Cyanosis	23	5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	1	--	--	--	--	--	7
Spina Bifida	10	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	2
Imperforate Anus	3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Congenital malformations	15	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1
Umbilical Hemorrhage	9	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Old Age	704	65	2	3	1	9	4	2	1	3	5	10	4	6	--	--	6	1	11	1	1	3	2	2	2	--	2	5	7	--	158
CLASS VI.—Local Diseases.																														
ORDER 1. OF NERVOUS SYSTEM.																														
Inflammation of Brain or its Membranes	252	36	2	2	--	2	4	1	--	--	1	3	3	1	--	--	1	1	--	--	--	--	--	--	--	--	--	1	--	--	58
Apoplexy	498	35	1	3	1	6	--	1	1	3	3	2	4	4	--	2	9	--	9	--	5	1	1	4	3	1	--	2	3	--	104
Softening of Brain	56	--	1	--	1	1	--	--	--	--	1	--	--	--	1	--	1	--	1	--	--	--	--	--	--	1	--	--	--	--	8
Hydrocephalus, not acute	24	1	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	2	--	--	--	--	--	--	--	--	--	--	--	4
Hemiplegia	32	1	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	3
Paralysis Agitans	40	--	--	--	--	--	--	--	--	--	--	1	--	1	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	3
Insanity	47	9	--	--	--	1	--	--	--	1	1	--	--	1	--	--	1	--	--	--	--	1	--	--	--	--	--	--	--	--	15
Chorea	4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Epilepsy	39	6	--	--	--	--	--	1	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	9
Convulsions	287	18	1	1	--	5	1	1	--	1	1	5	1	4	--	--	6	2	7	--	--	--	--	2	1	3	--	--	--	2	62
Trismus Nascentium	9	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	1
Tetanus	17	1	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2
Paraplegia	10	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1
Diseases of Spinal Chord	23	1	--	--	--	--	--	1	--	--	--	--	--	--	1	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	4
Myelitis	16	1	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	3
Spinal Meningitis	30	--	--	--	--	4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	5
Locomotor Ataxia	7	--	--	--	--	--	--	--	--	--	--	1	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	3
Other Diseases of Nervous System	218	18	--	2	2	--	1	2	1	--	--	--	--	--	--	--	--	--	5	3	--	--	--	1	--	2	--	--	--	--	37

TABLE VI.—CONTINUED. HARTFORD COUNTY.

CAUSES OF DEATH.	State.	Hartford.	Avon.	Berlin.	Bloomfield.	Bristol.	Burlington.	Canton.	East Granby.	East Hartford.	East Windsor.	Enfield.	Farmington.	Glastonbury.	Granby.	Hartland.	Manchester.	Marlborough.	New Britain.	Newington.	Plainville.	Rocky Hill.	Simsbury.	Southington.	South Windsor.	Suffield.	West Hartford.	Wethersfield.	Windsor.	Windsor Locks.	Total.
ORDER 2. OF ORGANS OF SPECIAL SENSE.																															
Otitis	2	---	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	---
ORDER 3. OF CIRCULATORY SYSTEM.																															
Endocarditis	63	---	--	1	--	--	--	4	--	--	--	--	6	--	--	--	--	--	15	--	--	--	--	--	--	--	--	--	--	--	26
Valvular Disease of Heart	176	---	1	2	--	--	--	1	--	--	--	--	--	6	--	--	--	--	4	--	1	--	--	5	--	--	1	--	--	3	24
Disease of Heart	403	55	4	--	--	--	4	--	--	4	6	14	--	--	--	1	5	2	1	1	--	--	5	3	1	--	1	--	--	--	107
Pericarditis	20	---	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	2
Hypertrophy of Heart	34	---	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2	--	--	--	1	--	--	1	5
Angina Pectoris	68	---	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	2
Syncope	9	---	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	---
Aneurism	5	---	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1
Senile Gangrene	28	3	1	--	--	--	--	--	--	1	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6
Thrombosis, Embolism	41	---	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	4	--	--	--	--	6
Phlebitis	4	---	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	---
Other Diseases of Circulatory System	77	---	--	--	--	6	--	--	1	1	--	--	--	--	--	--	1	--	--	--	--	1	--	--	--	--	--	1	--	--	11

Order 4. Of Respiratory System.																															
Laryngitis	23	1																													1
Catarrhal Croup	6											4																			4
Other Diseases of Larynx or Trachea	3																														
Emphysema, Asthma	32	2				1													1												4
Bronchitis	324	37		1						2	1	3	1				4		15		1		1	1	1	1	2		1		72
Pneumonia	915	76		4	6	5	2	4		6	5	8	2	7	1		4		15	2	5	2	2	5	1	4	1	6	4	10	187
Pleurisy	38	3																										1			4
Other Diseases of Respiratory Organs	38	1				1											2		1					1							6
Order 5. Of Digestive System.																															
Stomatitis	3																														
Dentition	45	2															1								1						4
Quinsy	5							1																							1
Dyspepsia	13																		1										1		2
Hæmatemesis	12	1														1															2
Disease of Stomach	86	6			1	1				1					1				3						1						14
Ulcer of Stomach	22	2				1															1			1							5
Enteritis	112	3			1						2	4					5		1		1	1						1			19
Ulceration of Intestines	9											1					1														2
Obstruction of Intestines	25			1						1	1								1												4
Strangulation of Intestines	1																														
Intussusception of Intestines	7																		1												1
Hernia	23	3										1		1					1												6
Fistula	1													1																	1
Peritonitis (not puerperal)	122	11			1		1			1		1			1				3											3	22
Ascites	7																														
Gallstones	2																1														1
Cirrhosis of Liver	63	7											1				1		2				1						1		13
Other Diseases of Liver	40	1		1								1											1						1		5
Hepatitis	29	5	1														1		1			1				1			2		12
Jaundice	15																														
Other Diseases of Digestive System	20										1						1														2

TABLE VI.—CONTINUED. HARTFORD COUNTY.

CAUSE OF DEATHS.	State.	Hartford.	Avon.	Berlin.	Bloomfield.	Bristol.	Burlington.	Canton.	East Granby.	East Hartford.	East Windsor.	Enfield.	Farmington.	Glastonbury.	Granby.	Hartland.	Manchester.	Marlborough.	New Britain.	Newington.	Plainville.	Rocky Hill.	Simsbury.	Southington.	South Windsor.	Suffield.	West Hartford.	Wethersfield.	Windsor.	Windsor Locks.	Total.
ORDER 6. OF LYMPHATIC SYSTEM AND DUCTLESS GLANDS.																															
Addison's Disease	6	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1
Diseases of Lymphatic System	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ORDER 7. OF URINARY SYSTEM.																															
Nephritis	79	7	--	--	--	1	--	--	--	1	1	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	1	--	--	--	12
Bright's Disease	281	30	--	1	1	6	--	1	--	3	4	3	--	--	--	--	3	--	6	--	--	1	2	--	--	1	2	1	5	2	72
Uræmia	34	4	1	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	1	--	--	--	--	--	8
Suppression of Urine	3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Calculus	3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hæmaturia	6	1	--	--	--	--	--	--	--	--	--	--	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3
Disease of Bladder	40	4	1	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	1	--	--	--	--	--	1	--	--	--	--	--	8
Prostatitis	14	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Diseases of Urinary System	10	--	--	--	--	--	--	--	--	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2

ORDER 8. OF GENERATIVE SYSTEM.																														
A. *Diseases of the Reproductive Organs.*																														
Diseases of the Uterus	9																				1	1								2
Metritis	6																													
Disease of Ovaries	17	2						1															1							4
Disorders of Menstruation	1																													
Menorrhagia	1																													
Perineal Abscess	2					1						1																		2
B. *Diseases of Parturition.*																														
Abortion and Miscarriage	7					2											1				1									4
Puerperal Mania	2																													
Puerperal Convulsions	16											3																		3
Puerperal Hemorrhage	7																													
Placenta Previa	2																													
Other Accidents of Childbirth	35	2																1												3
ORDER 9. OF ORGANS OF LOCOMOTION.																														
Caries, Necrosis	9																													
Arthritis, Periostitis	4																										1			1
Other Diseases of Organs of Locomotion	1					1																								1
ORDER 10. OF INTEGUMENTARY SYSTEM.																														
Bedsores	1																													
Other Diseases or Integumentary System	14	1									1																			2

TABLE VI—CONTINUED. HARTFORD COUNTY.

CAUSES OF DEATH.	State.	Hartford.	Avon.	Berlin.	Bloomfield.	Bristol.	Burlington.	Canton.	East Granby.	East Hartford.	East Windsor.	Enfield.	Farmington.	Glastonbury.	Granby.	Hartland.	Manchester.	Marlborough.	New Britain.	Newington.	Plainville.	Rocky Hill.	Simsbury.	Southington.	South Windsor.	Suffield.	West Hartford.	Wethersfield.	Windsor.	Windsor Locks.	Total.
CLASS VII.—Violence.																															
ORDER 1. ACCIDENT OR NEGLIGENCE.																															
Fractures and Contusions	46	17	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3	--	--	--	--	--	--	--	--	--	--	--	20
Fractures and Contusions of Skull	20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	1
Railroad Injuries	134	11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2	--	1	--	--	2	--	--	1	--	--	1	18
Gun-shot Wound	12	2	--		--	--	--	--	--	--	--	--	--	--	--	--	--	--	2	--	--	--	--	--	--	--	--	--	--	--	4
Burns and Scalds	30	2	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3
Poisoned	12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Drowning	89	5	--	--	--	3	--	--	--	1	--	--	2	--	--	1	1	--	--	--	--	--	1	--	1	--	--	--	1	--	16
Suffocation	17	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1
Other Accidents	82	30	--	--	--	--	1	--	--	--	--	--	--	--	--	--	2	--	--	1	--	--	--	--	--	--	--	--	3	2	39
Falling	47	--	--	--	1	3	--	--	--	--	--	2	--	2	--	--	--	--	--	--	--	--	--	--	--	1	1	--	--	1	11
ORDER 2. HOMICIDE.																															
Murder	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Manslaughter	5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

ORDER 3. SUICIDE.																														
Gun-shot Wounds	13	1	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	3
Cut, Stab	4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Poisoned	17	4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4
By Opium	8	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Drowning	20	1	--	--	--	--	--	--	--	--	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3
Hanging	16	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	3
Otherwise	4	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1
ORDER 4 EXECUTION.																														
Hanging	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1
CLASS VIII.—Unclassified.																														
Tumor	19	3	--	--	--	--	--	--	1	--	--	--	--	--	1	--	--	--	--	1	--	1	--	--	--	2	--	--	--	--	9
Dropsy	83	1	--	--	--	3	--	1	--	--	--	1	--	--	--	1	2	--	--	--	--	--	--	--	--	--	--	--	2	11
Debility, Atrophy, Inanition	302	39	1	2	--	7	1	1	--	--	2	--	3	1	--	--	3	--	7	--	--	--	1	1	--	--	--	--	2	3	74
Sunstroke	3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Exhaustion	89	--	--	--	1	8	--	1	--	--	--	--	--	--	--	1	1	--	--	--	--	--	--	--	--	1	--	--	--	13
Hemorrhage	32	7	--	--	--	--	2	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	1	12
Abscess	25	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1
Sudden Death	15	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	1	2
Other ill-defined causes	253	17	1	--	--	--	2	2	--	--	--	--	--	--	--	--	3	--	5	--	1	--	--	--	1	--	2	3	--	37
Cause not stated	56	--	--	--	--	--	--	--	--	--	--	5	--	3	--	--	4	--	1	--	--	--	1	--	1	1	--	--	--	16

RECAPITULATION OF HARTFORD COUNTY.

CLASSIFIED DISEASES.	State.	Hartford.	Avon.	Berlin.	Bloomfield.	Bristol.	Burlington.	Canton.	East Granby.	East Hartford.	East Windsor.	Enfield.	Farmington.	Glastonbury.	Granby.	Hartland.	Manchester.	Marlborough.	New Britain.	Newington.	Plainville.	Rocky Hill.	Simsbury.	Southington.	South Windsor.	Suffield.	West Hartford.	Wethersfield.	Windsor.	Windsor Locks.	Total.
All causes	12529	1067	22	39	25	107	35	51	7	66	50	126	42	58	15	8	123	10	310	15	38	16	27	60	31	36	30	33	53	57	2557
CLASSES.																															
I. Zymotic Diseases	2602	256	1	10	7	12	5	7	..	17	8	19	4	11	3	..	27	3	111	4	14	1	2	17	7	6	8	5	14	13	592
II. Parasitic Diseases	1	....	..	..	..	....	..	..	..	..	..	....	..	..	..	..	....	..	....	..	..	..	..	..	..	..	..	..	..	..	....
III. Dietetic Diseases	57	8	..	..	..	3	..	..	..	3	..	..	..	..	..	..	1	..	....	..	..	..	..	..	..	..	..	..	..	..	15
IV. Constitutional Diseases	2220	176	1	3	..	13	4	17	1	8	5	30	5	7	3	1	21	..	51	2	5	2	2	9	5	5	4	5	7	12	404
V. Developmental Diseases	1000	85	2	3	1	9	4	3	1	7	5	10	5	8	..	..	8	1	23	1	1	3	2	5	4	3	2	5	8	..	209
VI. Local Diseases	5192	398	15	21	15	45	16	19	4	29	29	57	22	26	8	4	49	5	104	6	16	9	18	25	12	18	10	15	18	21	1034
VII. Violence	580	76	1	..	1	7	1	..	..	2	1	4	2	2	..	1	3	1	8	1	1	..	1	3	1	1	2	..	4	4	128
VIII. Ill Defined and cause not stated	877	68	2	2	1	18	5	5	1	..	2	6	4	4	1	2	14	..	13	1	1	1	2	1	2	3	4	3	2	7	175
Class I. Orders.																															
1. Miasmatic Diseases	1356	180	..	3	4	7	2	4	..	13	3	9	2	10	..	..	16	..	48	..	5	..	1	6	5	4	6	..	8	6	342
2. Diarrhœal Diseases	999	65	1	3	3	5	2	2	..	3	5	9	2	1	3	..	11	3	60	2	7	1	..	5	1	1	2	4	5	7	213
3. Malarial Diseases	117	3	..	3	..	....	..	..	..	..	..	....	..	..	..	..	....	..	1	1	1	..	1	5	..	..	..	1	..	..	16
4. Zoogenous Diseases	1	....	..	..	..	....	..	..	..	..	..	....	..	..	..	..	....	..	....	..	..	..	..	..	..	..	..	..	..	..	....
5. Venereal Diseases	7	1	..	..	..	....	..	..	..	1	..	....	..	..	..	..	....	..	....	..	..	..	..	..	..	..	..	..	..	..	2
6. Septic	122	7	..	1	..	....	1	1	..	..	..	1	..	..	..	..	....	..	2	1	1	..	..	1	1	1	..	..	1	..	19
Class II. Orders.																															
Parasitic Diseases	1	....	..	..	..	....	..	..	..	..	..	....	..	..	..	..	....	..	....	..	..	..	..	..	..	..	..	..	..	..	....

Class III. Orders.																														
Dietetic Diseases	57	8	--	--	--	3	--	--	--	3	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	15
Class IV. Orders.																														
Constitutional Diseases	2220	176	1	3	--	13	4	17	1	8	5	30	5	7	3	1	21	--	51	2	5	2	2	9	5	5	4	5	7	12	404
Class V. Orders.																														
Developmental Diseases	1000	85	2	3	1	9	4	3	1	7	5	10	5	8	--	--	8	1	23	1	1	3	2	5	4	3	2	5	8	--	209
Class VI. Orders.																														
1. Diseases of Nervous System	1609	127	5	9	5	19	7	7	2	6	7	12	9	11	4	2	18	3	28	3	5	2	3	8	4	7	--	4	3	2	322
2. Organs of Special Sense	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3. Circulatory System	928	58	7	4	--	6	5	5	2	6	6	15	6	6	1	1	6	2	21	1	1	1	7	8	2	4	4	1	--	4	190
4. Respiratory System	1379	120	--	5	6	7	2	4	--	8	6	15	3	7	1	--	10	--	32	2	6	2	3	7	2	5	3	7	5	10	278
5. Digestive System	662	41	1	2	3	2	1	1	--	3	4	8	1	2	2	1	11	--	14	--	2	2	2	1	2	1	--	1	5	3	116
6. Lymphatic Syst. and Ductless Glands	8	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1
7. Urinary System	470	46	2	1	1	7	1	1	--	6	5	3	3	--	--	--	3	--	8	--	--	1	2	1	2	1	3	1	5	2	105
8. Generative System	105	4	--	--	--	3	--	1	--	--	--	4	--	--	--	--	1	--	1	--	2	1	1	--	--	--	--	--	--	--	18
9. Organs of Locomotion	14	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	2
10. Integumentary System	15	1	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2
Class VII. Orders.																														
1. Accident or Negligence	390	68	--	--	1	6	1	--	--	2	--	2	2	2	--	1	3	--	8	1	1	--	1	2	1	1	2	--	4	4	113
2. Homicide	7	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3. Suicide	82	7	1	--	--	1	--	--	--	--	1	2	--	--	--	--	--	1	--	--	--	--	--	1	--	--	--	--	--	--	14
4. Execution	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1
Class VIII. Orders.																														
1. Ill Defined	821	68	2	2	1	18	5	5	1	--	2	1	4	1	1	2	10	--	12	1	1	1	1	1	1	2	4	3	2	7	159
2. Cause not stated	56	--	--	--	--	--	--	--	--	--	--	5	--	3	--	--	4	--	1	--	--	--	1	--	1	1	--	--	--	--	16

TABLE VI.—Continued.

New Haven County.

CAUSES OF DEATH.	State.	New Haven.	Ansonia.	Beacon Falls.	Bethany.	Branford.	Cheshire.	Derby.	East Haven.	Guilford.	Hamden.	Madison.	Meriden.	Middlebury.	Milford.	Naugatuck.	North Branford.	North Haven.	Orange.	Oxford.	Prospect.	Seymour.	Southbury.	Wallingford.	Waterbury.	Wolcott.	Woodbridge.	Total.
CLASS 1—Zymotic Diseases.																												
Order 1. Miasmatic.																												
Chicken Pox	1																								1			1
Measles	62	1	1										7												2			11
Scarlet Fever	81	6											2			1						3		1				13
Typhus Fever	8																											
Relapsing Fever	1																											
Influenza	4																											
Typhoid Fever	281	24	2			1	1	1			1		7		1	5		1	1	1		2		2	11	1		62
Cerebro-Spinal Fever	40	3		1				1					1							1				1	2			10
Continued Fever	37		2					2				1	6															11
Whooping Cough	92	11	1					1					7			2			1	1					18			42
Diphtheria	584	79	4		1	3		11		1			60		3						1	1		10	22			196
Membranous Croup	133	21	3			3		2					8			1				1				1	6			46
Other Miasmatic Diseases	32															3			1									4

ORDER 2. DIARRHŒAL.																											
Cholera Infantum	506	59	12			3	1	4		2	1		28			1			1						41			153
Infantile Diarrhœa	257	55	1					3					10		2			1	1					2	13			88
Cholera Morbus	36	1						1					1												2			5
Dysentery	146	5	1					2		1			5	1					1					1	12			29
Diarrhœa	54	7					1				1	1										1		1	3			15
ORDER 3. MALARIAL.																											
Intermittent Fever	21	16																										16
Remittent Fever	30												2												1			3
Pernicious or Congestive Fever	17	1								1																		2
Other Malarial Diseases	49							1	1				5		1		1		1					4				14
ORDER 4. ZOOGENOUS.																											
Hydrophobia	1																											
Cow Pox and effects of Vaccination																												
ORDER 5. VENEREAL.																											
Syphilis	4	1																							1			2
Gonorrhœa, Stricture of Uretha	2	1																										1
Other Venereal Diseases	1																											
ORDER 6. SEPTIC.																											
Erysipelas	22	5						1	1		1					3								1				12
Pyæmia Septicæmia	51	9						1								3			1			1	1					16
Puerperal Fever	49	4	2				1	1					2						1					1	4			16
CLASS II.—Parasitic Diseases.																											
Thrush	1												1															1
Other Parasitic Diseases																												

TABLE VI—CONTINUED. NEW HAVEN COUNTY.

CAUSES OF DEATH.	State.	New Haven.	Ansonia.	Beacon Falls.	Bethany.	Branford.	Cheshire.	Derby.	East Haven.	Guilford.	Hamden.	Madison.	Meriden.	Middlebury.	Milford.	Naugatuck.	No. Branford.	North Haven.	Orange.	Oxford.	Prospect.	Seymour.	Southbury.	Wallingford.	Waterbury.	Wolcott.	Woodbridge.	Total.
CLASS III.—Dietetic Diseases.																												
Intemperance	25	---	---	---	---	---	---	--	--	--	--	--	1	--	--	1	--	--	--	--	--	--	--	--	3	--	--	5
Chronic Alcoholism	23	7	---	---	---	---	---	--	--	--	--	--	1	--	--	--	--	-	--	--	--	--	--	--	--	--	--	8
Delirium Tremens	9	3	---	---	---	---	---	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3
CLASS IV.—Constitutional Diseases.																												
Rheumatism	103	25	2	---	---	---	---	2	2	--	--	--	2	--	--	2	--	--	2	--	--	--	--	--	8	--	--	45
Gout	2	---	---	---	---	---	---	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	----
Rickets	5	2	---	---	---	---	---	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2
Cancer of Breast	38	4	---	---	---	1	1	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	7
Cancer of Stomach	69	11	1	---	---	---	---	1	--	1	--	--	2	--	1	--	--	--	1	--	--	--	--	--	1	--	--	19
Cancer of Womb	49	8	---	---	---	---	---	1	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	10
Cancer of other organs	168	15	---	---	1	---	1	--	--	1	1	--	5	--	2	1	--	--	--	--	--	--	--	1	4	--	1	33
Tabes Mesenterica	75	9	---	---	---	2	1	--	--	--	--	--	--	--	1	--	--	--	--	--	--	1	--	--	10	--	--	24
Tubercular Meningitis, Acute Hydroceph.	81	3	1	---	---	1	---	--	--	--	1	--	5	--	--	--	--	-	--	--	--	1	--	2	6	--	--	20
Phthisis	1459	204	13	---	2	8	5	18	1	4	5	4	43	2	5	12	--	--	3	3	--	9	1	5	73	1	2	423
Other forms of Tuberculosis	59	1	2	---	1	1	--	2	--	--	--	--	2	--	--	4	--	--	1	1	--	--	--	1	2	1	--	19
Scrofula	25	6	---	---	---	---	---	--	--	--	1	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	8
Pott's Disease	3	---	---	---	---	---	---	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	----
Hip-Joint Disease	2	---	---	---	---	---	---	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	----
Purpura	3	---	---	---	---	---	---	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1
Anæmia	23	5	1	---	---	---	---	--	--	--	--	--	2	--	--	1	--	--	--	--	--	--	--	--	--	--	--	9

Diabetes	48	2						1											1			2			1			7
Other Constitutional Diseases	8																											
CLASS V.—Developmental Diseases.																												
Premature Birth	217	45	2			1					1		9		1	2	1	3	1					3	14			83
Atelectasis	19	7											2												2			11
Cyanosis	23	4																							1			5
Spina Bifida	10	1											1												1			3
Imperforate Anus	3	1																							1			2
Other Congenital malformations	15	3									1		1							1								6
Umbilical Hemorrhage	9	2										1			1			2							1			7
Old Age	704	68	1	1	1	3	3	6	2	1	2	2	6		3	6	4		3			1	3	1	20		2	139
CLASS VI.—Local Diseases.																												
ORDER 1. OF NERVOUS SYSTEM.																												
Inflammation of Brain or its Membranes	252	38	3	1		5		6	1				9	1	3	4		1		1				1	7			81
Apoplexy	498	51	1			1	2	3		2	2	1	12	1	2				4	2			1	3	20	2	1	111
Softening of Brain	56	3				1		2					2		1					1		1		2				13
Hydrocephalus, not acute	24	2						2					2												1			7
Hemiplegia	32	3	1								1																	5
Paralysis Agitans	40	1			1														1								1	4
Insanity	47	6										1								1					2			10
Chorea	4	1																	1									2
Epilepsy	39	3											1		1				1					2				8
Convulsions	287	40	4	1		1		3		1	1		14	1	1	3			1			4	2	1	9			87
Trismus Nascentium	9	4																										4
Tetanus	17	4											2												2			8
Paraplegia	10							1																	3			4
Diseases of Spinal Cord	23														1													1
Myelitis	16	5				1		1																				7
Spinal Meningitis	30	2						1					1															4
Locomotor Ataxia	7																											
Other Diseases of Nervous System	218	20	1			3		4		2	1	3	7		1	4	2		3						1			52

TABLE VI—CONTINUED. NEW HAVEN COUNTY.

CAUSES OF DEATH.	State.	New Haven.	Ansonia.	Beacon Falls.	Bethany.	Branford.	Cheshire.	Derby.	East Haven.	Guilford.	Hamden.	Madison.	Meriden.	Middlebury.	Milford.	Naugatuck.	No. Branford.	North Haven.	Orange.	Oxford.	Prospect.	Seymour.	Southbury.	Wallingford.	Waterbury.	Wolcott.	Woodbridge.	Total.
ORDER 2. OF ORGANS OF SPECIAL SENSE.																												
Otitis	2	1																										1
ORDER 3. OF CIRCULATORY SYSTEM																												
Endocarditis	63	3		1							1		1						1						7			14
Valvular Disease of Heart	176	26			1	1	1	1	1	2	1	1	2						5		1	5						48
Disease of Heart	403	29	1	3				8		2		2	11		1	3		1	2	2				2	15		7	89
Pericarditis	20												1				1							2	1			5
Hypertrophy of Heart	34	11						1																				12
Angina Pectoris	68	14						2		1		1	1															19
Syncope	9																									1		1
Aneurism	5	3																				1						4
Senile Gangrene	28	3	1																2									6
Thrombosis, Embolism	41							1					2											1				4
Phlebitis	4	1																										1
Other Diseases of Circulatory System	77	1	3																1	2					5	1		13

ORDER 4. OF RESPIRATORY SYSTEM.																												
Laryngitis	23	2	1			1		1					1										2					8
Catarrhal Croup	6																											
Other Diseases of Larynx or Trachea	3	1																										1
Emphysema, Asthma	32	2									1		1				1						1	1	1			8
Bronchitis	324	64	1			2	2	4	2		2	1	5		1	1	1		2				1	24		1		114
Pneumonia	915	124	4		1	4	2	11		2	3		40		5	11		2	9	1			3	6	27			255
Pleurisy	38	5	1							1														1	1			9
Other Diseases of Respiratory System	38	3									2														1			6
ORDER 5. OF DIGESTIVE SYSTEM.																												
Stomatitis	3																											
Dentition	45	6											2											6				14
Quinsy	5																							1				1
Dyspepsia	13		1					1			1		1															4
Hæmatemesis	12												1											1				2
Disease of Stomach	86	13											1				1		2					6				23
Ulcer of Stomach	22		1										2															3
Enteritis	112	5	2			1					1		2						1				1	4				17
Ulceration of Intestines	9	1																										1
Obstruction of Intestines	25	2			1					1									1					2				7
Strangulation of Intestines	1	1																										1
Intussusception of Intestines	7	2											1		1													4
Hernia	23	3											3											1				7
Fistula	1																											
Peritonitis (not puerperal)	122	16	3					1					4					1					1	2				28
Ascites	7	1													1													2
Gallstones	2																											
Cirrhosis of Liver	63	8				1		1	2	1	1		4							1				4				23
Other Diseases of Liver	40	1						1	1	1			1											4		1		10
Hepatitis	29	3	2								1																	6
Jaundice	15	1	2					1					1															5
Other Diseases of Digestive System	20	2																										2

TABLE VI—CONTINUED. NEW HAVEN COUNTY.

CAUSES OF DEATH.	State.	New Haven.	Ansonia.	Beacon Falls.	Bethany.	Branford.	Cheshire.	Derby.	East Haven.	Guilford.	Hamden.	Madison.	Meriden.	Middlebury.	Milford.	Naugatuck.	No. Branford.	North Haven.	Orange.	Oxford.	Prospect.	Seymour.	Southbury.	Wallingford.	Waterbury.	Wolcott.	Woodbridge.	Total.
ORDER 6. OF LYMPHATIC SYSTEM AND DUCTLESS GLANDS.																												
Addison's Disease	6	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1
Diseases of Lymphatic System	2	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1
ORDER 7. OF URINARY SYSTEM.																												
Nephritis	79	21	1	--	--	1	--	--	--	--	--	--	7	--	1	--	--	--	--	--	--	--	1	--	1	--	--	33
Bright's Disease	281	31	2	--	--	2	--	3	--	3	--	1	6	--	1	2	--	2	1	--	--	2	--	--	8	--	--	64
Uræmia	34	1	--	--	--	--	--	--	--	1	--	--	3	--	--	1	--	--	--	--	--	--	--	--	--	--	--	6
Suppression of Urine	3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	----
Calculus	3	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1
Hæmaturia	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	1	--	--	--	2
Disease of Bladder	40	3	--	--	--	--	--	--	1	2	--	--	--	--	--	--	--	1	--	--	--	--	--	--	1	--	--	8
Prostatitis	14	1	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	3
Other Diseases of Urinary System	10	2	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	2	--	--	5

ORDER 8. OF GENERATIVE SYSTEM.																												
A. Diseases of Reproductive Organs.																												
Diseases of the Uterus	9	1												1														2
Metritis	6	1	1																					3				5
Disease of Ovaries	17	3																										3
Disorders of Menstruation	1																											
Menorrhagia	1	1																										1
Perineal Abscess	2																											
B. Diseases of Parturition.																												
Abortion and Miscarriage	7																							2				2
Puerperal Mania	2																											
Puerperal Convulsions	16	4														1								1				6
Puerperal Hemorrhage	7																											
Placenta Previa	2	1											1															2
Other Accidents of Childbirth	35	4					1	1			1		1						1					2				11
ORDER 9. OF ORGANS OF LOCOMOTION.																												
Caries, Necrosis	9						1						1															2
Arthritis, Periostitis	4																											
Other Diseases of Organs of Locomotion	1																											
ORDER 10. OF INTEGUMENTARY SYSTEM.																												
Bedsores	1																											
Other Diseases of Integumentary System	14		1										2											1				4

TABLE VI—CONTINUED. NEW HAVEN COUNTY.

CAUSES OF DEATH.	State.	New Haven.	Ansonia.	Beacon Falls.	Bethany.	Branford.	Cheshire.	Derby.	East Haven.	Guilford.	Hamden.	Madison.	Meriden.	Middlebury.	Milford.	Naugatuck.	No. Branford.	North Haven.	Orange.	Oxford.	Prospect.	Seymour.	Southbury.	Wallingford.	Waterbury.	Wolcott.	Woodbridge.	Total.
CLASS VII.—Violence.																												
ORDER 1. ACCIDENT OR NEGLIGENCE.																												
Fractures and Contusions	46	3	---	---	---	---	---	---	---	---	---	1	---	---	---	2	---	---	1	---	---	2	---	---	1	---	---	10
Fractures and Contusions of Skull	20	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	4
Railroad Injuries	134	18	---	---	---	3	---	3	---	---	---	---	6	1	3	1	---	1	---	---	---	2	---	2	5	---	---	45
Gun-shot Wound	12	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	3
Burns and Scalds	30	4	---	---	---	1	---	---	---	1	---	---	3	---	---	---	---	---	---	---	---	---	---	---	1	---	---	10
Poisoned	12	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2	---	---	3
By Arsenic	1	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1
Drowning	89	7	2	---	---	---	---	3	1	1	---	---	---	1	---	2	---	---	---	---	---	1	---	1	---	---	---	19
Suffocation	17	1	---	---	---	---	---	---	---	---	---	---	2	---	---	---	---	---	---	---	---	---	---	1	---	---	---	4
Other Accidents	82	9	---	---	---	---	---	2	---	---	---	---	1	---	1	1	---	---	---	---	---	---	---	---	---	---	---	14
Falling	47	5	1	---	---	---	---	---	---	---	1	---	1	---	---	---	---	---	---	---	---	2	---	1	2	---	---	13
OTHERS 2. HOMICIDE.																												
Murder	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1	---	---	---	---	---	---	---	---	---	---	---	1
Manslaughter	5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Order 3. Suicide.																											
Gun-shot Wounds	13																										
Cut, Stab	4																									1	1
Poisoned	17	3											2			1											6
By Opium	8	4	1										1														6
Drowning	20	1	1								1				2												5
Hanging	16	1						1					2							1							5
Otherwise	4														1												1
Order 4. Execution.																											
Hanging	1																										
CLASS VIII.—Unclassified.																											
Tumor	19										1		1														2
Dropsy	83	3					1	1	1			1	7						1								15
Debility, Atrophy, Inanition	302	44				1		11		2	5					2	1			2				1	11		80
Sunstroke	3										1																1
Exhaustion	89							1		1						2						1		2	1		8
Hemorrhage	32					1		2					1			1								1	3		9
Abscess	25	6						1								1		1			1						10
Sudden Death	15																										
Other ill-defined causes	253	10	2			2		4		1	1		4			9			1			3	2	26	17		82
Cause not stated	56					1										6					1			1			9

RECAPITULATION OF NEW HAVEN COUNTY.

CLASSIFIED DISEASES.	State.	New Haven.	Ansonia.	Beacon Falls.	Bethany.	Branford.	Cheshire.	Derby.	East Haven.	Guilford.	Hamden.	Madison.	Meriden.	Middlebury.	Milford.	Naugatuck.	North Branford.	North Haven.	Orange.	Oxford.	Prospect.	Seymour.	Southbury.	Wallingford.	Waterbury.	Wolcott.	Woodbridge.	Total.
All causes	12529	1490	97	8	10	61	25	153	18	40	46	22	426	9	50	108	13	19	63	23	4	47	16	100	510	8	17	3383
CLASSES.																												
I. Zymotic Diseases	2602	309	29	1	1	10	4	32	2	5	4	2	151	1	7	19	1	2	9	4	1	8	1	25	139	1	--	768
II. Parasitic	1	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1
III. Dietitic	57	10	--	--	--	--	--	--	--	--	--	--	2	--	--	1	--	--	--	--	--	--	--	--	3	--	--	16
IV. Constitutional	2220	295	20	--	4	13	8	25	3	6	8	4	62	2	10	20	--	2	8	4	--	13	1	9	105	2	3	627
V. Developmental	1000	131	3	1	1	4	3	6	2	1	4	3	19	--	5	8	5	5	4	1	--	1	3	4	40	--	2	256
VI. Local	5192	617	38	6	4	25	9	61	9	22	20	11	160	4	21	31	6	8	39	11	1	14	9	26	180	5	11	1348
VII. Violence	580	65	5	--	--	4	--	9	1	2	2	1	18	2	7	8	--	1	1	1	--	7	--	5	11	--	1	151
VIII. Ill Defined and Cause not stated	877	63	2	--	--	5	1	20	1	4	8	1	13	--	--	21	1	1	2	2	2	4	2	31	32	--	--	216
Class I. Orders.																												
1. Miasmatic Diseases	1356	145	13	1	1	7	1	18	--	1	1	1	98	--	4	12	--	1	3	4	1	6	--	15	62	1	--	396
2. Diarrhœal Diseases	999	127	14	--	--	3	2	10	--	3	2	1	44	1	2	1	--	1	3	--	--	1	--	4	71	--	--	290
3. Malarial Diseases	117	17	--	--	--	--	--	1	1	1	--	--	7	--	1	--	1	--	1	--	--	--	--	4	1	--	--	35
4. Zoogenous Diseases	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5. Venereal Diseases	7	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6. Septic Diseases	122	18	2	--	--	--	1	3	1	--	1	--	2	--	--	6	--	--	2	--	--	1	1	2	4	--	--	44
Class II. Orders.																												
Parasitic Diseases	1	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1

Class III. Orders.																											
Dietetic Diseases	57	10	--	--	--	--	--	--	--	--	--	--	2	--	--	1	--	--	--	--	--	--	--	3	--	--	16
Class IV. Orders.																											
Constitutional Diseases	2220	295	20	--	4	13	8	25	3	6	8	4	62	2	10	20	--	2	8	4	--	13	1	9	105	2	3	627
Class V. Orders.																											
Developmental Diseases	1000	131	3	1	1	4	3	6	2	1	4	3	19	--	5	8	5	5	4	1	--	1	3	4	40	--	2	256
Class VI. Orders.																											
1. Diseases of Nervous System	1609	183	10	2	1	12	2	23	1	5	5	5	50	3	10	11	2	1	11	5	--	5	3	9	45	2	2	408
2. Organs of Special Sense	2	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1
3. Circulatory System	928	91	5	4	1	1	1	13	1	5	2	4	18	--	1	3	1	1	11	4	1	6	--	5	28	2	7	216
4. Respiratory System	1379	201	7	--	1	7	4	16	2	3	8	1	47	--	6	12	2	2	11	1	--	--	3	11	54	1	1	401
5. Digestive System	662	65	11	--	1	2	--	5	3	3	4	--	23	--	2	--	1	1	4	1	--	--	2	--	31	--	1	160
6. Lymphatic Syst. and Ductless Glands	8	1	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2
7. Urinary System	470	60	3	--	--	3	--	3	2	6	--	1	16	--	2	4	--	3	1	--	--	3	1	1	13	--	--	122
8. Generative System	105	15	1	--	--	--	1	1	--	--	1	--	2	1	--	1	--	--	1	--	--	--	--	--	8	--	--	32
9. Organs of Locomotion	14	--	--	--	--	--	1	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2
10. Integumentary System	15	--	1	--	--	--	--	--	--	--	--	--	2	--	--	--	--	--	--	--	--	--	--	--	1	--	--	4
Class VII. Orders.																											
1. Accident or Negligence	390	56	3	--	--	4	--	8	1	2	1	1	13	2	4	6	--	1	1	--	--	7	--	5	11	--	--	126
2. Homicide	7	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	1
3. Suicide	82	9	2	--	--	--	--	1	--	--	1	--	5	--	3	1	--	--	--	1	--	--	--	--	--	--	1	24
4. Execution	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	----
Class VIII. Orders.																											
1. Ill Defined	821	63	2	--	--	4	1	20	1	4	8	1	13	--	--	15	1	1	2	2	1	4	2	30	32	--	--	207
2. Cause not stated	56	--	--	--	--	1	--	--	--	--	--	--	--	--	--	6	--	--	--	--	1	--	--	1	--	--	--	9

TABLE VI.—Continued.

NEW LONDON COUNTY.

CAUSES OF DEATH.	State.	New London.	Bozrah.	Colchester.	East Lyme.	Franklin.	Griswold.	Groton.	Lebanon.	Ledyard.	Lisbon.	Lyme.	Montville.	Norwich.	No. Stonington.	Old Lyme.	Preston.	Salem.	Sprague.	Stonington.	Voluntown.	Waterford.	Total.
CLASS I.—Zymotic Diseases.																							
ORDER 1. MIASMATIC.																							
Chicken Pox	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Measles	62	2	---	---	---	---	1	1	---	---	---	---	---	---	---	---	---	---	---	---	---	2	6
Scarlet Fever	81	1	---	---	---	---	1	---	---	---	---	---	---	1	---	---	---	---	---	---	---	---	3
Typhus Fever	8	---	---	---	---	---	---	---	---	---	---	1	---	---	---	---	---	---	---	3	---	---	4
Relapsing Fever	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Influenza	4	---	---	---	---	---	---	1	1	---	---	---	---	---	---	---	---	---	---	---	---	---	2
Typhoid Fever	281	6	2	1	1	1	1	1	---	1	---	---	---	8	1	1	---	---	---	---	---	2	26
Cerebro-Spinal Fever	40	1	---	---	---	---	1	---	---	---	---	---	---	1	---	---	---	---	---	---	---	---	3
Continued Fever	37	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Whooping Cough	92	---	---	1	---	---	1	1	---	1	---	---	---	---	1	---	---	---	---	---	---	---	5
Diphtheria	584	15	---	---	1	2	8	2	---	---	---	---	---	2	1	1	---	---	---	2	5	---	39
Membranous Croup	133	3	---	---	---	---	3	---	---	---	---	---	---	1	---	---	---	---	---	1	2	1	11
Other Miasmatic Diseases	32	1	---	---	---	---	---	---	---	---	---	---	---	1	---	---	---	---	---	---	---	---	2

ORDER 2. DIARRHŒAL DISEASES.																							
Cholera Infantum	506	13	---	1	---	---	1	7	---	---	---	---	2	12	---	---	2	---	---	2	1	---	41
Infantile Diarrhœa	257	5	---	---	1	---	---	---	---	---	---	---	1	5	---	1	---	---	---	---	---	1	14
Cholera Morbus	36	---	1	---	---	---	---	---	---	---	---	---	---	1	---	---	---	---	---	---	---	---	2
Dysentery	146	---	---	---	1	---	1	3	---	---	---	---	1	1	---	---	---	---	---	---	---	3	10
Diarrhœa	54	---	---	---	---	---	---	---	---	---	---	---	---	2	---	---	---	---	---	---	---	---	2
ORDER 3. MALARIAL DISEASES.																							
Intermittent Fever	21	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2
Remittent Fever	30	---	---	---	---	---	---	---	---	---	---	---	---	1	---	---	---	---	---	---	---	---	1
Pernicious or Congestive Fever	17	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Other Malarial Diseases	49	---	---	---	---	---	1	---	---	1	---	---	---	2	---	---	---	---	---	---	---	---	4
ORDER 4. ZOOGENOUS DISEASES.																							
Hydrophobia	1	---	---	---	---	---	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1
Cow Pox and effects of Vaccination	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
ORDER 5. VENEREAL DISEASES.																							
Syphilis	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Gonorohœa, Stricture of Uretha	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Other Venereal Diseases	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1	---	---	1
ORDER 6. SEPTIC DISEASES.																							
Erysipelas	22	---	---	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1
Pyæmia, Septicæmia	51	5	---	1	---	---	---	---	---	---	---	---	---	4	---	1	---	---	---	1	---	---	12
Puerperal Fever	49	2	1	1	---	---	---	---	---	---	---	---	---	---	---	---	1	---	---	---	---	---	5
CLASS II.—Parasitic Diseases.																							
Thrush	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Other Parasitic Diseases	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
CLASS III.—Dietetic Diseases.																							
Intemperance	25	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2	---	---	2
Chronic Alcoholism	23	---	---	---	---	---	---	---	---	---	---	---	---	1	---	---	---	---	---	---	---	---	1
Delirium Tremens	9	---	---	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1	2

TABLE VI—CONTINUED. NEW LONDON COUNTY.

CAUSES OF DEATH.	State.	New London.	Bozrah.	Colchester.	East Lyme.	Franklin.	Griswold.	Groton.	Lebanon.	Ledyard.	Lisbon.	Lyme.	Montville.	Norwich.	No. Stonington.	Old Lyme.	Preston.	Salem.	Sprague.	Stonington.	Voluntown.	Waterford.	Total.
CLASS IV.—Constitutional Diseases.																							
Rheumatism	103	---	---	---	1	---	---	---	---	---	---	---	---	6	1	---	2	---	---	---	---	---	10
Gout	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	----
Rickets	5	---	---	---	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	----
Cancer of Breast	38	---	---	---	---	---	---	---	---	---	---	---	---	1	---	---	---	---	---	---	---	1	2
Cancer of Stomach	69	2	---	1	1	1	---	1	---	---	---	---	---	2	---	---	---	---	1	1	---	---	10
Cancer of Womb	49	---	---	---	---	---	---	---	---	---	---	---	---	3	---	---	---	---	---	---	---	---	3
Cancer of other organs	168	3	---	1	---	1	---	---	---	1	1	---	---	9	---	---	1	1	---	4	---	3	25
Tabes Mesenterica	75	3	---	---	---	---	---	---	---	---	---	---	1	5	---	---	---	---	---	4	---	---	13
Tubercular Meningitis, Acute Hydroceph	81	4	---	---	---	---	2	2	---	---	1	---	---	2	---	---	---	---	1	3	---	---	15
Phthisis	1459	18	---	9	7	---	10	15	3	---	2	1	2	45	---	2	2	---	4	20	6	6	152
Other forms of Tuberculosis	59	---	---	---	---	---	---	---	---	---	1	1	3	1	---	---	---	---	---	2	---	1	9
Scrofula	25	---	---	---	---	---	1	---	1	---	---	---	1	---	1	---	---	---	---	1	---	---	5
Pott's Disease	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	----
Hip-Joint Disease	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	----
Purpura	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	----
Anæmia	23	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1
Diabetes	48	2	---	---	---	1	---	---	---	---	---	---	1	1	---	---	---	---	---	1	---	---	6
Other Constitutional Diseases	8	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	----

CLASS V.—Developmental Diseases.																							
Premature Birth	217	---	---	---	1	---	3	1	---	---	---	---	3	4	---	---	1	---	---	---	---	---	13
Atelectasis	19	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Cyanosis	23	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2	---	---	2
Spina Bifida	10	---	---	---	---	---	---	---	---	---	---	---	---	2	---	---	---	---	---	---	---	---	2
Imperforate Anus	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Other Congenital malformations	15	---	---	---	---	---	---	---	---	---	---	---	---	1	---	---	---	---	---	---	1	---	2
Umbilical Hemorrhage	9	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Old Age	704	11	---	6	1	---	3	9	2	1	---	1	9	18	3	---	1	---	1	9	---	7	82
CLASS VI.—Local Diseases.																							
ORDER 1. OF NERVOUS SYSTEM.																							
Inflammation of Brain or its Membranes	252	8	---	1	---	---	---	---	---	---	---	---	1	7	---	---	---	---	---	1	1	1	20
Apoplexy	498	12	---	1	2	1	1	3	1	2	1	---	3	8	1	2	---	---	---	5	---	---	43
Softening of Brain	56	---	---	1	---	---	---	---	---	---	---	---	---	1	1	---	---	---	1	---	---	---	4
Hydrocephalus, not acute	24	---	---	---	---	---	---	---	---	---	---	---	---	4	---	---	---	---	---	---	---	1	5
Hemiplegia	32	1	---	---	---	---	---	---	---	---	---	---	---	1	---	---	---	---	---	---	---	---	2
Paralysis Agitans	40	---	---	---	---	---	---	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1
Insanity	47	---	---	---	---	---	---	---	---	---	---	---	---	2	1	---	---	---	2	---	---	---	5
Chorea	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Epilepsy	39	---	---	1	---	---	---	---	1	---	---	---	---	2	---	---	---	---	---	---	---	---	4
Convulsions	287	11	---	---	---	---	1	3	---	---	---	---	---	15	---	---	---	---	---	3	---	---	33
Trismus Nascentium	9	---	---	---	---	---	---	---	1	---	---	---	---	---	---	---	---	---	---	---	---	---	1
Tetanus	17	---	---	---	---	---	---	---	---	1	---	---	---	---	---	---	---	---	---	---	---	---	1
Paraplegia	10	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Diseases of Spinal Cord	23	---	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1
Myelitis	16	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1
Spinal Meningitis	30	---	---	---	---	1	---	---	---	---	---	---	---	---	---	---	---	---	---	4	---	---	5
Locomotor Ataxia	7	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Other Diseases of Nervous System	218	8	---	1	1	---	---	---	1	---	---	---	1	5	1	1	---	---	---	4	1	---	24

TABLE VI—CONTINUED. NEW LONDON COUNTY.

CAUSES OF DEATH.	STATE.	New London.	Bozrah.	Colchester.	East Lyme.	Franklin.	Griswold.	Groton.	Lebanon.	Ledyard.	Lisbon.	Lyme.	Montville.	Norwich.	No. Stonington.	Old Lyme.	Preston.	Salem.	Sprague.	Stonington.	Voluntown.	Waterford.	TOTAL.
ORDER 2. OF ORGANS OF SPECIAL SENSE.																							
Otitis	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
ORDER 3. OF CIRCULATORY SYSTEM.																							
Endocarditis	63	---	---	---	---	---	---	---	---	---	---	---	---	1	---	---	---	---	---	---	---	---	1
Valvular Disease of Heart	176	---	---	1	1	---	---	---	---	---	---	---	---	---	---	---	---	---	1	6	---	3	12
Disease of Heart	403	---	---	1	1	---	2	6	---	1	---	---	---	15	2	---	---	---	---	7	---	3	38
Pericarditis	20	---	---	---	---	---	---	---	---	---	---	---	---	1	---	---	---	---	---	---	---	---	1
Hypertrophy of Heart	34	---	---	---	---	---	---	1	---	---	---	---	---	1	---	---	---	---	---	---	---	---	2
Angina Pectoris	68	22	---	---	---	---	---	---	---	---	---	---	---	4	---	---	---	---	---	2	---	---	28
Syncope	9	---	---	---	---	1	---	---	---	---	1	---	---	---	---	---	---	---	---	1	---	---	3
Aneurism	5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Senile Gangrene	28	1	---	1	---	---	---	---	---	---	---	---	---	2	1	1	---	---	---	---	---	---	6
Thrombosis, Embolism	41	---	---	---	---	---	---	---	---	---	---	3	1	3	---	1	8	---	---	---	---	---	16
Phlebitis	4	---	---	---	---	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2
Other Diseases of Circulatory System	77	---	---	---	---	---	---	---	---	---	---	---	1	1	---	---	1	---	---	---	1	1	5

Order 4. Of Respiratory System.																							
Laryngitis	23	1	---	---	---	---	---	1	1	---	---	---	---	1	---	---	---	---	---	---	---	---	4
Catarrhal Croup	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Other Diseases of Larynx or Trachea	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Emphysema Asthma	32	1	1	---	---	---	1	---	---	---	---	---	---	3	1	---	---	---	---	1	---	---	8
Bronchitis	324	5	---	---	---	---	---	---	---	1	---	---	2	7	---	---	1	---	---	1	---	2	19
Pneumonia	915	15	1	7	4	1	5	7	---	3	---	---	4	28	5	---	5	---	1	5	1	7	99
Pleurisy	38	---	---	---	---	---	---	---	---	---	---	---	---	2	---	---	---	---	---	---	---	---	2
Other Diseases of Respiratory System	38	1	---	1	---	---	---	---	1	---	---	---	---	3	---	---	---	---	---	---	---	1	7
Order 5. Of Digestive System.																							
Stomatitis	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Dentition	45	---	---	---	---	---	2	---	---	---	---	---	---	1	---	---	---	---	---	---	---	---	3
Quinsy	5	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1
Dyspepsia	13	---	1	---	---	---	---	---	---	---	---	---	---	1	1	1	---	---	---	---	---	---	4
Hæmatemesis	12	---	---	---	---	---	---	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1
Disease of Stomach	86	4	---	---	1	---	1	---	---	---	---	---	---	---	---	---	---	---	---	1	1	---	8
Ulcer of Stomach	22	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2	---	3
Enteritis	112	3	---	---	---	1	3	2	1	2	1	---	1	7	---	---	1	---	---	6	---	---	28
Ulceration of Intestines	9	---	---	---	---	---	---	---	---	---	---	---	---	1	---	---	---	---	---	---	---	---	1
Obstruction of Intestines	25	---	---	---	---	---	---	---	---	---	---	---	1	2	---	---	---	---	---	---	---	---	3
Strangulation of Intestines	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Intussusception of Intestines	7	---	---	---	---	---	---	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1
Hernia	23	---	---	---	---	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1
Fistula	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Peritonitis (not puerperal)	122	2	---	---	---	---	---	---	---	---	---	---	---	3	---	---	---	---	---	3	---	---	8
Ascites	7	1	---	---	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	4
Gallstones	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Cirrhosis of Liver	63	1	---	---	---	---	---	---	---	---	---	---	1	1	---	---	---	---	---	---	---	---	3
Other Diseases of Liver	40	---	---	---	---	---	---	---	---	---	---	---	1	1	---	1	---	---	---	---	---	---	3
Hepatitis	29	---	---	---	---	---	---	---	---	---	---	---	---	1	---	---	---	---	---	---	---	---	1
Jaundice	15	---	---	---	2	---	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	3
Other Diseases of Digestive System	20	---	---	---	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1

TABLE VI—CONTINUED. NEW LONDON COUNTY.

CAUSES OF DEATH.	State.	New London.	Bozrah.	Colchester.	East Lyme.	Franklin.	Griswold.	Groton.	Lebanon.	Ledyard.	Lisbon.	Lyme.	Montville.	Norwich.	No. Stonington.	Old Lyme.	Preston.	Salem.	Sprague.	Stonington.	Voluntown.	Waterford.	Total.
ORDER 6. OF LYMPHATIC SYSTEM AND DUCTLESS GLANDS.																							
Addison's Disease	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Diseases of Lymphatic System	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
ORDER 7. OF URINARY SYSTEM.																							
Nephritis	79	3	---	---	1	---	---	---	---	---	---	---	---	1	---	---	1	---	---	2	---	---	8
Bright's Disease	281	7	---	3	2	---	---	1	3	1	1	1	---	9	1	1	---	---	---	---	---	1	31
Uræmia	34	1	---	---	---	---	---	---	---	---	---	---	---	2	---	---	---	---	---	1	---	---	4
Suppression of Urine	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Calculus	3	---	---	---	---	---	---	---	---	---	---	---	1	---	---	---	---	---	---	---	---	---	1
Hæmaturia	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Disease of Bladder	40	---	---	1	---	---	---	1	---	---	---	---	---	1	---	---	1	---	---	---	---	---	4
Prostatitis	14	---	---	---	2	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	4
Other Diseases of Urinary System	10	---	---	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1

Order 8. Of Generative System.																							
A. Diseases of the Reproductive Organs.																							
Diseases of the Uterus	9	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Metritis	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1	---	---	1
Disease of Ovaries	17	---	---	---	---	---	---	---	1	---	---	---	---	---	---	---	---	---	---	---	---	---	1
Disorders of Menstruation	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Menorrhagia	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Perineal Abscess	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
B. Diseases of Parturition.																							
Abortion and Miscarriage	7	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Puerperal Mania	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Puerperal Convulsions	16	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Puerperal Hemorrhage	7	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1	---	---	---	---	---	1
Placenta Previa	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Other Accidents of Childbirth	35	---	---	---	---	---	---	---	---	---	---	---	---	1	---	---	---	---	---	---	---	---	1
Order 9. Of Organs of Locomotion.																							
Caries, Necrosis	9	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1	---	---	---	---	---	---	1
Arthritis, Periostitis	4	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1
Other Diseases of Organs of Locomotion	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Order 10. Of Integumentary System.																							
Bedsores	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Other Diseases of Integumentary System	14	1	---	---	---	---	---	---	---	---	---	---	---	1	---	---	---	---	---	---	---	---	2

TABLE VI—CONTINUED. NEW LONDON COUNTY.

CAUSES OF DEATH.	State.	New London.	Bozrah.	Colchester.	East Lyme.	Franklin.	Griswold.	Groton.	Lebanon.	Ledyard.	Lisbon.	Lyme.	Montville.	Norwich.	No. Stonington.	Old Lyme.	Preston.	Salem.	Sprague.	Stonington.	Voluntown.	Waterford.	Total.
CLASS VII.—Violence.																							
ORDER 1. ACCIDENT AND NEGLIGENCE.																							
Fractures and Contusions	46	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Fractures and Contusions of Skull	20	1	---	---	---	---	---	---	---	---	---	---	1	1	---	---	---	---	---	---	---	---	3
Railroad Injuries	134	---	---	1	1	---	---	2	---	---	---	---	---	1	---	---	---	---	---	2	---	---	7
Gun-shot Wound	12	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Burns and Scalds	30	---	---	---	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1
Poisoned	12	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
By Arsenic	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Drowning	89	2	---	---	---	---	2	---	---	---	---	---	---	6	---	---	1	---	---	---	---	---	11
Suffocation	17	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Other Accidents	82	1	---	2	---	---	---	1	---	---	---	---	---	1	---	---	---	---	---	---	---	1	6
Falling	47	1	---	---	---	---	---	2	---	---	---	---	---	---	1	---	---	---	1	---	2	---	7
ORDER 2. HOMICIDE.																							
Murder	2	---	---	---	---	---	---	---	---	---	---	---	---	1	---	---	---	---	---	---	---	---	1
Manslaughter	5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

ORDER 3. SUICIDE.																							
Gun-shot Wounds	13	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Cut, Stab	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Poisoned	17	---	---	---	---	---	---	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
By Opium	8	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Drowning	20	2	---	---	---	---	---	1	---	---	---	---	---	---	---	---	---	---	---	1	---	---	4
Hanging	16	---	---	---	---	---	---	---	---	---	---	---	---	2	---	---	---	---	---	---	---	---	2
Otherwise	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
ORDER 4. EXECUTION.																							
Hanging	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
CLASS VIII.—Unclassified.																							
Tumor	19	---	---	---	---	---	---	---	---	---	---	---	---	1	---	---	---	---	---	---	---	---	1
Dropsy	83	4	---	---	---	---	---	2	---	---	---	---	---	---	1	---	---	1	1	3	---	---	12
Debility, Atrophy, Inanition	302	16	---	---	---	---	1	1	---	---	---	---	---	23	---	1	3	---	1	---	---	4	50
Sunstroke	3	---	---	---	---	---	---	---	---	1	---	---	---	---	---	---	---	---	---	---	---	---	1
Exhaustion	89	9	---	---	---	---	---	5	---	---	1	---	---	---	1	---	---	---	---	9	1	---	26
Hemorrhage	32	---	---	---	1	---	---	---	---	---	---	---	---	1	---	---	---	---	---	---	---	---	2
Abscess	25	---	---	---	---	---	---	---	---	---	---	---	---	---	1	---	---	---	---	---	---	---	1
Sudden Death	15	---	---	---	---	---	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1
Other ill-defined causes	253	6	---	---	---	---	2	3	2	1	---	---	---	---	---	---	---	---	---	2	3	2	21
Cause not stated	56	---	---	---	1	---	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2

RECAPITULATION OF NEW LONDON COUNTY.

CLASSIFIED DISEASES.	State.	New London.	Bozrah.	Colchester.	East Lyme.	Franklin.	Griswold.	Groton.	Lebanon.	Ledyard.	Lisbon.	Lyme	Montville.	Norwich.	No. Stonington.	Old Lyme.	Preston.	Salem.	Sprague.	Stonington.	Voluntown.	Waterford.	Total.
All causes	12529	255	8	48	40	16	62	90	21	18	10	8	43	330	27	16	33	2	15	130	28	55	1255
CLASSES.																							
I. Zymotic Diseases	2602	56	4	6	4	3	20	16	1	3	--	1	4	42	3	4	3	---	---	10	8	9	197
II. Parasitic Diseases	1	---	---	---	---	---	---	---	---	--	--	--	---	---	---	---	---	---	---	---	---	---	---
III. Dietetic Diseases	57	---	---	1	---	---	---	---	---	--	--	--	---	1	---	---	---	---	---	2	---	1	5
IV. Constitutional Diseases	2220	33	---	11	9	3	13	18	4	1	5	2	8	75	2	2	5	1	6	36	6	11	251
V. Developmental Diseases	1000	11	---	6	2	---	6	10	2	1	--	1	12	25	3	---	2	---	1	11	1	7	101
VI. Local Diseases	5192	113	4	21	21	10	17	28	11	11	4	4	18	150	15	9	19	---	5	54	7	20	541
VII. Violence	580	7	---	3	2	---	2	7	---	--	--	--	1	12	1	---	1	---	1	3	2	1	43
VIII. Ill Defined and Causes not stated	877	35	---	---	2	---	4	11	3	2	1	--	---	25	3	1	3	1	2	14	4	6	117
Class I. Orders.																							
1. Miasmatic Diseases	1356	29	2	2	2	3	16	6	1	2	--	1	---	14	3	2	---	---	---	6	7	5	101
2. Diarrhœal Diseases	999	18	1	1	2	---	2	10	---	--	--	--	4	21	---	1	2	---	---	2	1	4	69
3. Malarial Diseases	117	2	---	---	---	---	1	---	---	1	--	--	---	3	---	---	---	---	---	---	---	---	7
4. Zoogenous Diseases	1	---	---	---	---	---	1	---	---	--	--	--	---	---	---	---	---	---	---	---	---	---	1
5 Venereal Diseases	7	---	---	---	---	---	---	---	---	--	--	--	---	---	---	---	---	---	---	1	---	---	1
6. Septic Diseases	122	7	1	3	---	---	---	---	---	--	--	--	---	4	---	1	1	---	---	1	---	---	18
Class II. Orders.																							
Parasitic Diseases	1	---	---	---	---	---	---	---	---	--	--	--	---	---	---	---	---	---	---	---	---	---	---

Class III. Orders.																							
Dietetic Diseases	57	---	---	1	---	---	---	---	---	---	---	---	---	1	---	---	---	---	---	2	---	1	5
Class IV. Orders.																							
Constitutional Diseases	2220	33	---	11	9	3	13	18	4	1	5	2	8	75	2	2	5	1	6	36	6	11	251
Class V. Orders.																							
Developmental Diseases	1000	11	---	6	2	---	6	10	2	1	---	1	12	25	3	---	2	---	1	11	1	7	101
Class VI. Orders.																							
1. Diseases of Nervous System	1609	41	1	5	3	2	2	7	4	3	1	---	5	45	4	3	---	---	3	17	2	2	150
2. Organs of Special Sense	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3. Circulatory System	928	23	---	3	2	3	2	7	---	1	1	3	2	28	3	2	9	---	1	16	1	7	114
4. Respiratory System	1379	23	2	8	4	1	6	8	2	4	---	---	6	44	6	---	6	---	1	7	1	10	139
5. Digestive System	662	13	1	---	7	2	7	4	1	2	1	---	4	18	1	2	1	---	---	10	3	---	77
6. Lymphatic Syst. and Ductless Glands	8	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
7. Urinary System	470	11	---	5	5	2	---	2	3	1	1	1	1	13	1	1	2	---	---	3	---	1	53
8. Generative System	105	---	---	---	---	---	---	---	1	---	---	---	---	1	---	---	1	---	---	1	---	---	4
9. Organs of Locomotion	14	1	---	---	---	---	---	---	---	---	---	---	---	---	---	1	---	---	---	---	---	---	2
10. Integumentary System	15	1	---	---	---	---	---	---	---	---	---	---	---	---	1	---	---	---	---	---	---	---	2
Class VII. Orders.																							
1. Accident or Negligence	390	5	---	3	2	---	2	5	---	---	---	---	1	9	1	---	1	---	1	2	2	1	35
2. Homicide	7	---	---	---	---	---	---	---	---	---	---	---	1	---	---	---	---	---	---	---	---	---	1
3. Suicide	82	2	---	---	---	---	---	2	---	---	---	---	---	2	---	---	---	---	---	1	---	---	7
4. Execution	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Class VIII. Orders.																							
1. Ill Defined	821	35	---	---	1	---	3	11	3	2	1	---	---	25	3	1	3	1	2	14	4	6	115
2. Cause not stated	56	---	---	---	1	---	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2

TABLE VI.—Continued.

FAIRFIELD COUNTY.

CAUSES OF DEATH.	State.	Danbury.	Bridgeport.	Bethel.	Brookfield.	Darien.	Easton.	Fairfield.	Greenwich.	Huntington.	Monroe.	New Canaan.	New Fairfield.	Newtown.	Norwalk.	Redding.	Ridgefield.	Sherman.	Stamford.	Stratford.	Trumbull.	Weston.	Westport.	Wilton.	Total.
CLASS I.—Zymotic Diseases.																									
ORDER I. MIASMATIC.																									
Chicken Pox	1																								
Measles	62	3	10																						13
Scarlet Fever	81	14	11	2					1			1			3	2			15	1			1		51
Typhus Fever	8																			1					1
Relapsing Fever	1														1										1
Influenza	4																								
Typhoid Fever	281	22	8	1					3	2		1		2	4	2		1	8	2	1		9	2	68
Cerebro-Spinal Fever	40	1	1						2										2						6
Continued Fever	37		6																						6
Whooping Cough	92	2	8			1			3						1		1		2					1	19
Diphtheria	584	21	55			3			4	1					10	1				8	2	1	2	2	110
Membranous Croup	133	7	8					1	2			1			3				1	1					24
Other Miasmatic Diseases	32	5															1		2						8

ORDER 2. DIARRHŒAL.																									
Cholera Infantum	506	16	37	2	---	2	---	4	11	2	---	1	---	2	20	1	1	--	24	2	--	--	2	1	128
Infantile Diarrhœa	257	4	18	2	---	1	---	1	---	---	---	---	---	---	4	--	--	--	3	2	1	--	--	1	37
Cholera Morbus	36	1	2	---	---	---	---	---	---	---	---	---	---	---	1	--	--	--	3	--	--	--	--	--	7
Dysentery	146	---	10	---	---	---	---	---	---	---	---	1	---	---	---	--	1	--	4	1	--	--	--	--	17
Diarrhœa	54	4	---	---	---	---	---	---	---	1	---	1	---	---	1	--	1	--	1	--	--	--	--	--	9
ORDER 3. MALARIAL.																									
Intermittent Fever	21	---	---	---	---	---	---	---	---	---	---	---	---	---	---	--	--	--	--	--	--	--	--	--	----
Remittent Fever	30	---	7	---	---	---	1	1	1	1	---	---	---	1	1	--	--	--	--	1	--	--	1	--	15
Pernicious or Congestive Fever	17	---	3	---	---	---	---	---	---	---	---	---	---	---	2	--	--	--	--	--	--	--	--	--	5
Other Malarial Diseases	49	---	12	1	---	---	2	---	---	1	---	---	---	1	5	--	--	--	1	--	--	--	--	--	23
ORDER 4. ZOOGENOUS.																									
Hydrophobia	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	--	--	--	--	--	--	--	--	--	----
Cow Pox and effects of Vaccination	----	---	---	---	---	---	---	---	---	---	---	---	---	---	---	--	--	--	--	--	--	--	--	--	----
ORDER 5. VENEREAL.																									
Syphilis	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	--	--	--	--	--	--	--	--	--	----
Gonorrhœa, Stricture of Urethra	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	--	--	--	1	--	--	--	--	--	1
Other Venereal Diseases	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	--	--	--	--	--	--	--	--	--	----
ORDER 6. SEPTIC.																									
Erysipelas	22	---	---	---	---	---	---	---	1	1	---	---	---	---	---	--	--	--	--	--	--	--	--	--	2
Pyæmia, Septicæmia	51	1	1	---	---	---	---	---	---	---	---	---	---	---	---	--	--	--	2	--	--	--	--	1	5
Puerperal Fever	49	2	3	1	---	1	---	---	---	---	---	---	---	2	---	--	1	--	--	--	--	--	--	--	10
CLASS II.—Parasitic Diseases.																									
Thrush	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	--	--	--	--	--	--	--	--	--	----
Other Parasitic Diseases	----	---	---	---	---	---	---	---	---	---	---	---	---	---	---	--	--	--	--	--	--	--	--	--	----
CLASS III.—Dietetic Diseases.																									
Intemperance	25	---	---	---	---	---	---	---	1	---	---	1	---	1	---	--	--	--	1	--	--	--	--	--	4
Chronic Alcoholism	23	1	5	---	---	---	---	---	---	---	---	---	---	---	---	--	--	--	--	--	--	--	--	--	6
Delirium Tremens	9	---	---	---	---	---	---	---	---	---	---	---	---	---	---	--	--	--	--	--	--	--	--	--	----

TABLE VI—CONTINUED. FAIRFIELD COUNTY.

CAUSES OF DEATH.	STATE.	Danbury.	Bridgeport.	Bethel.	Brookfield.	Darien.	Easton.	Fairfield.	Greenwich.	Huntington.	Monroe.	New Canaan.	New Fairfield.	Newtown.	Norwalk.	Redding.	Ridgefield.	Sherman.	Stamford.	Stratford.	Trumbull.	Weston.	Westport.	Wilton.	TOTAL.
CLASS IV.—Constitutional Diseases.																									
Rheumatism	103	3	7	---	---	---	---	---	1	1	1	---	---	3	3	---	1	---	1	---	1	---	---	---	22
Gout	2	---	---	---	---	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1
Rickets	5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Cancer of Breast	38	---	3	---	1	1	---	1	---	---	---	---	---	---	2	---	---	---	1	---	---	---	---	---	9
Cancer of Stomach	69	1	4	---	---	---	---	1	---	---	---	---	---	---	2	---	1	---	1	---	---	---	---	---	10
Cancer of Womb	49	---	3	---	---	---	---	1	---	---	1	---	1	---	---	---	---	---	2	---	---	---	1	---	9
Cancer of other organs	168	7	5	3	---	---	---	---	2	1	---	---	2	2	---	1	---	---	3	2	---	---	3	---	31
Tabes Mesenterica	75	1	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	10	---	---	---	---	---	12
Tubercular Meningitis, Acute Hydrocephalus	81	2	10	---	---	---	---	2	---	---	---	---	---	---	---	---	---	---	1	1	---	1	1	---	18
Phthisis	1459	35	104	9	1	6	2	7	19	10	3	7	---	12	17	6	3	1	20	14	---	4	9	2	291
Other forms of Tuberculosis	59	---	3	---	---	---	---	---	2	---	---	1	---	---	2	---	---	---	1	---	---	---	1	---	10
Scrofula	25	---	---	---	---	---	---	---	---	---	---	---	---	---	1	---	---	---	1	---	---	---	---	---	2
Pott's Disease	3	---	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1
Hip-Joint Disease	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Purpura	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Anæmia	23	1	1	---	---	---	---	---	---	---	---	---	---	---	---	---	1	---	---	---	---	---	---	---	3
Diabetes	48	2	6	---	---	---	---	---	---	---	---	---	---	---	3	---	---	---	2	2	---	---	1	1	17
Other Constitutional Diseases	8	---	7	---	---	---	---	---	---	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	8

CLASS V.—Developmental Diseases.																								
Premature Birth	217	6	14	2		1		1	2						5				3					34
Atelectasis	19	2							1															3
Cyanosis	23		1												1				1					3
Spina Bifida	10	2																						2
Imperforate Anus	3																							
Other Congenital malformations	15		1						1								1							3
Umbilical Hemorrhage	9																							
Old Age	704	16	23	2	3	4	4	10	10	8	2	1		10	10	4	1		15	1	3		5	1	133
CLASS VI.—Local Diseases.																								
ORDER 1. OF NERVOUS SYSTEM.																								
Inflammation of Brain or its Membranes	252	4	14		1	1		1	1	1		2		3	8		1		4		1	1		1	44
Apoplexy	498	12	27	1		4		4	6	5	2	2		4	12	1	4		9	2	4	1	1		101
Softening of Brain	56	2	4			1			2	1				1	1				1				1		14
Hydrocephalus, not acute	24		1							1															2
Hemiplegia	32		4	1		1			1						1				1				1		10
Paralysis Agitans	40											2	1		1								3		7
Insanity	47																								
Chorea	4									1															1
Epilepsy	39		4						2														1		7
Convulsions	287	13	21	1	1	1		5	4					1	9	1			9				2		68
Trismus Nascentium	9		1																			1			2
Tetanus	17	1	1											1											3
Paraplegia	10					1			1												1				3
Diseases of Spinal Cord	23					1		5	2										3	1					12
Myelitis	16	1	1							1															3
Spinal Meningitis	30	1	1		1			2										1		1	1				8
Locomotor Ataxia	7		2			1																			3
Other Diseases of Nervous System	218	9	14	3					3	2	1			1	3	1	2		4	1		1	1		46

TABLE VI—CONTINUED. FAIRFIELD COUNTY.

CAUSES OF DEATH.	State.	Danbury.	Bridgeport.	Bethel.	Brookfield.	Darien.	Easton.	Fairfield.	Greenwich.	Huntington.	Monroe.	New Canaan.	New Fairfield.	Newtown.	Norwalk.	Redding.	Ridgefield.	Sherman.	Stamford.	Stratford.	Trumbull.	Weston.	Westport.	Wilton.	Total.
ORDER 2. OF ORGANS OF SPECIAL SENSE.																									
Otitis	2	---	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1
ORDER 3. OF CIRCULATORY SYSTEM.																									
Endocarditis	63	1	4	---	---	---	---	---	5	1	1	---	1	---	2	---	---	---	1	---	---	---	1	---	17
Valvular Disease of Heart	176	7	14	---	---	3	---	---	---	1	---	---	---	3	7	---	---	---	5	---	---	---	---	1	41
Disease of Heart	403	12	23	---	3	2	2	4	---	4	---	3	---	5	10	---	---	---	7	---	---	1	7	---	83
Pericarditis	20	1	3	---	---	---	---	---	2	---	1	---	---	---	---	---	---	---	---	1	---	---	---	---	8
Hypertrophy of Heart	34	---	2	---	---	---	---	---	---	---	---	---	1	---	1	---	---	---	---	---	1	---	---	---	5
Angina Pectoris	68	1	1	---	---	1	---	---	---	---	---	---	---	---	2	---	---	---	---	---	---	---	---	1	6
Syncope	9	---	---	---	---	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2
Aneurism	5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Senile Gangrene	28	1	---	1	---	1	1	---	---	---	---	---	---	---	---	---	1	---	---	---	---	---	---	1	6
Thrombosis, Embolism	41	---	3	---	---	---	---	1	---	---	---	---	---	2	---	---	---	---	1	---	---	---	---	---	7
Phlebitis	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Other Diseases of Circulatory System	77	---	1	---	---	---	---	---	1	---	7	---	---	---	---	---	3	---	---	---	1	3	---	---	16

ORDER 4. OF RESPIRATORY SYSTEM.																									
Laryngitis	23	2	5												1										8
Catarrhal Croup	6																								
Other Diseases of Larynx or Trachea	3								1																1
Emphysema, Asthma	32											1	1						1						3
Bronchitis	324	5	34	2				1	3	2		1			10		2		4	6	1			1	72
Pneumonia	915	13	70	5		3	3	2	12	5	1	1		6	19	2	2		16	4	2	2	2	3	173
Pleurisy	38	1	4						5						1										11
Other Diseases of Respiratory System	38	2	3							1				1			2		2						11
ORDER 5. OF DIGESTIVE SYSTEM.																									
Stomatitis	3		2																						2
Dentition	45	2	3												6				4						15
Quinsy	5		1																						1
Dyspepsia	13		1																						1
Hæmatemesis	12		2													1								1	4
Disease of Stomach	86	5	6		1	1			1	2					4										20
Ulcer of Stomach	22		2																6					1	9
Enteritis	112	6	8						4								1		4	2			1	1	27
Ulceration of Intestines	9	1	1																						2
Obstruction of Intestines	25	1	4																	1					6
Strangulation of Intestines	1																								
Intussusception of Intestines	7																								
Hernia	23		1							1				1											3
Fistula	1																								
Peritonitis (not puerperal)	122	6	6	1		2			1	2	1	2			10				6	1			2		40
Ascites	7																								
Gallstones	2								1																1
Cirrhosis of Liver	63		13																						13
Other Diseases of Liver	40		5								1							1	3						10
Hepatitis	29		1	1		1									1										4
Jaundice	15	1																							1
Other Diseases of Digestive System	20	1	1						2						2				1						7

TABLE VI—CONTINUED. FAIRFIELD COUNTY.

CAUSES OF DEATH.	State.	Danbury.	Bridgeport.	Bethel.	Brookfield.	Darien.	Easton.	Fairfield.	Greenwich.	Huntington.	Monroe.	New Canaan.	New Fairfield.	Newtown.	Norwalk.	Redding.	Ridgefield.	Sherman.	Stamford.	Stratford.	Trumbull.	Weston.	Westport.	Wilton.	Total.
ORDER 6. OF LYMPHATIC SYSTEM AND DUCTLESS GLANDS.																									
Addison's Disease	6	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1
Diseases of Lymphatic System	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
ORDER 7. OF URINARY SYSTEM.																									
Nephritis	79	---	7	---	1	---	---	---	---	---	---	---	---	3	2	---	---	---	3	---	---	---	---	1	17
Bright's Disease	281	2	13	---	---	4	---	3	3	1	---	1	---	---	12	1	1	---	4	1	---	---	1	---	47
Uræmia	34	---	4	---	1	1	---	---	---	---	---	---	---	1	---	---	---	---	3	---	---	---	1	---	11
Suppression of Urine	3	---	1	---	---	---	---	---	---	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2
Calculus	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Hæmaturia	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1	1
Disease of Bladder	40	2	1	---	---	1	---	---	2	---	---	1	---	---	---	---	---	---	---	---	1	---	---	---	8
Prostatitis	14	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1
Other Diseases of Urinary System	10	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Order 8. Of Generative System.																									
A. Diseases of the Reproductive Organs.																									
Diseases of the Uterus	9		2																						2
Metritis	6																								
Disease of Ovaries	17		1						2																3
Disorders of Menstruation	1																								
Menorrhagia	1																								
Perineal Abscess	2																								
B. Diseases of Parturition.																									
Abortion and Miscarriage	7		1																						1
Puerperal Mania	2																								
Puerperal Convulsions	16				1			2																	3
Puerperal Hemorrhage	7								1				1												2
Placenta Previa	2																								
Other Accidents of Childbirth	35	1	3												3										7
Order 9. Of Organs of Locomotion.																									
Caries, Necrosis	9																								
Arthritis, Periostitis	4		1																						1
Other Diseases of Organs of Locomotion	1																								
Order 10. Of Integumentary System.																									
Bedsores	1																								
Other Diseases of Integumentary System	14		3														2								5

TABLE VI—CONTINUED. FAIRFIELD COUNTY.

CAUSES OF DEATH.	State.	Danbury.	Bridgeport.	Bethel.	Brookfield.	Darien.	Easton.	Fairfield.	Greenwich.	Huntington.	Monroe.	New Canaan.	New Fairfield.	Newtown.	Norwalk.	Redding.	Ridgefield.	Sherman.	Stamford.	Stratford.	Trumbull.	Weston.	Westport.	Wilton.	Total.
CLASS VII.—Violence.																									
ORDER 1. ACCIDENT AND NEGLIGENCE.																									
Fractures and Contusions	46	---	---	---	---	---	---	---	1	---	---	---	---	---	1	--	1	--	2	1	--	--	--	--	6
Fractures and Contusions of Skull	20	1	1	---	---	---	---	---	---	---	---	---	---	---	1	--	--	--	--	--	--	--	--	1	4
Railroad Injuries	134	6	15	---	1	---	---	1	4	---	---	---	---	1	10	1	--	--	3	--	--	--	1	1	44
Gun-shot Wound	12	1	---	---	---	---	---	---	1	---	---	---	---	---	1	--	--	--	--	--	--	--	--	--	3
Burns and Scalds	30	3	4	---	---	---	---	---	---	1	---	---	---	---	---	--	--	--	1	1	--	--	--	--	10
Poisoned	12	1	1	---	---	---	---	1	---	---	---	---	---	---	---	--	--	--	--	--	--	--	--	1	4
By Arsenic	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	--	--	--	--	--	--	--	--	--	---
Drowning	89	2	10	---	---	---	---	2	1	---	---	---	---	1	1	--	--	--	2	2	--	--	--	--	21
Suffocation	17	2	2	---	---	---	---	---	2	---	---	---	---	---	---	--	--	--	--	--	--	--	--	--	6
Other Accidents	82	2	2	1	---	---	---	---	---	1	---	---	1	---	1	--	--	--	2	--	--	1	--	--	11
Falling	47	1	5	1	---	---	---	---	---	---	---	---	---	---	---	--	--	--	--	--	--	--	--	--	7
ORDER 2. HOMICIDE.																									
Murder	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	--	--	--	--	--	--	--	--	--	---
Manslaughter	5	1	3	---	---	---	---	---	---	---	---	---	---	---	---	--	--	--	1	--	--	--	--	--	5

ORDER 3. SUICIDE.																									
Gun-shot Wounds	13	1	5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1	---	---	---	---	---	7
Cut, Stab	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Poisoned	17	---	---	1	---	---	---	---	1	---	---	1	---	---	---	---	---	---	---	---	---	---	---	---	3
By Opium	8	---	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1
Drowning	20	---	---	---	---	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1	---	---	1	3
Hanging	16	---	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1
Otherwise	4	---	---	---	---	---	---	---	1	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2
ORDER 4. EXECUTION.																									
Hanging	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
CLASS VIII.—Unclassified.																									
Tumor	19	---	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1	---	---	---	---	---	3
Dropsy	83	4	3	---	---	---	3	---	---	---	---	---	1	---	1	1	1	1	3	---	---	1	1	---	20
Debility, Atrophy, Inanition	302	---	30	---	---	---	---	---	4	1	1	1	---	---	1	---	---	---	7	2	---	---	---	---	47
Sunstroke	3	---	---	---	---	---	---	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1
Exhaustion	89	4	1	1	---	---	1	3	1	---	---	---	---	---	---	---	---	---	5	---	---	---	1	---	17
Hemorrhage	32	1	---	---	---	---	---	---	---	---	---	---	---	---	2	---	---	---	---	---	---	---	---	---	3
Abscess	25	---	4	---	---	---	---	---	---	---	1	---	---	---	1	---	---	---	1	---	---	---	---	---	7
Sudden Death	15	---	---	---	---	---	---	---	---	---	---	---	---	---	1	1	3	---	---	4	---	---	1	---	10
Other ill-defined causes	253	---	5	---	---	---	---	---	1	2	1	---	---	4	15	2	---	---	22	---	---	1	---	---	53
Cause not stated	56	1	---	---	---	---	---	---	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	3

RECAPITULATION OF FAIRFIELD COUNTY.

CLASSIFIED CAUSES.	State.	Danbury.	Bridgeport.	Bethel.	Brookfield.	Darien.	Easton.	Fairfield.	Greenwich.	Huntington.	Monroe.	New Canaan.	New Fairfield.	Newtown	Norwalk.	Redding.	Ridgefield.	Sherman.	Stamford.	Stratford.	Trumbull.	Weston.	Westport.	Wilton.	Total.
All causes	12529	332	851	45	16	55	19	68	154	69	25	34	10	75	266	29	40	5	285	70	22	19	65	29	2583
CLASSES.																									
I. Zymotic Diseases	2602	103	200	9	---	8	3	7	28	9	---	6	--	8	56	6	6	1	69	19	4	1	15	8	566
II. Parasitic	1	---	---	---	---	---	---	---	---	---	---	---	--	--	--	--	--	--	---	--	--	--	--	--	---
III. Dietetic	57	1	5	---	---	---	---	---	1	---	---	1	--	1	---	--	--	--	1	--	--	--	--	--	10
IV. Constitutional	2220	52	155	12	2	8	2	12	24	13	5	8	3	17	30	7	6	1	43	19	1	5	16	3	444
V. Developmental	1000	26	39	4	3	5	4	11	14	8	2	1	--	10	16	4	2	--	19	1	3	--	5	1	178
VI. Local	5192	119	357	16	10	33	6	30	68	33	15	16	5	33	128	7	21	2	102	21	13	10	25	13	1083
VII. Violence	580	21	50	3	1	1	---	4	11	3	---	1	1	2	15	1	1	--	12	4	1	1	1	4	138
VIII. Ill Defined and Cause not stated	877	10	45	1	---	---	4	4	8	3	3	1	1	4	21	4	4	1	39	6	--	2	3	--	164
Class I. Orders.																									
1. Miasmatic Diseases	1356	75	107	3	---	4	---	1	15	3	---	3	--	2	22	5	2	1	30	13	3	1	12	5	307
2. Diarrhœal Diseases	999	25	67	4	---	3	---	5	11	3	---	3	--	2	26	1	3	--	35	5	1	--	2	2	198
3. Malarial Diseases	117	---	22	1	---	---	3	1	1	2	---	---	--	2	8	--	--	--	1	1	--	--	1	--	43
4. Zoogenous Diseases	1	---	---	---	---	---	---	---	---	---	---	---	--	--	---	--	--	--	---	--	--	--	--	--	---
5. Venereal Diseases	7	---	---	---	---	---	---	---	---	---	---	---	--	--	---	--	--	--	1	--	--	--	--	--	1
6. Septic	122	3	4	1	---	1	---	---	1	1	---	---	--	2	---	--	1	--	2	--	--	--	--	1	17
Class II. Orders.																									
Parasitic Diseases	1	---	---	---	---	---	---	---	---	---	---	---	--	--	---	--	--	--	---	--	--	--	--	--	---

Class III. Orders.																									
Dietetic Diseases	57	1	5	---	---	---	---	---	1	---	---	1	--	1	---	--	--	--	1	--	--	--	--	--	10
Class IV. Orders.																									
Constitutional Diseases	2220	52	155	12	2	8	2	12	24	13	5	8	3	17	30	7	6	1	43	19	1	5	16	3	444
Class V. Orders.																									
Developmental Diseases	1000	26	39	4	3	5	4	11	14	8	2	1	--	10	16	4	2	--	19	1	3	--	5	1	178
Class VI. Orders.																									
1. Diseases of Nervous System	1609	43	95	6	3	11	---	17	22	12	3	6	1	11	35	3	7	1	31	5	7	4	10	1	334
2. Organs of Special Sense	2	---	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3. Circulatory System	928	23	51	1	3	9	3	5	8	6	9	3	2	10	22	--	4	--	14	1	2	4	8	3	191
4. Respiratory System	1379	23	116	7	---	3	3	3	21	8	1	3	1	7	31	2	6	--	23	10	3	2	2	4	179
5. Digestive System	662	23	57	2	1	4	---	---	9	5	2	2	--	1	23	1	1	1	24	4	--	--	3	3	166
6. Lymphatic Syst. and Ductless Glands	8	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1
7. Urinary System	470	5	26	---	2	6	---	3	5	2	---	2	--	4	14	1	1	--	10	1	1	--	2	2	87
8. Generative System	105	1	7	---	1	---	---	2	3	---	---	---	1	--	3	--	--	--	---	--	--	--	--	--	18
9. Organs of Locomotion	14	---	1	---	---	---	---	---	---	---	---	---	--	--	---	--	--	--	---	--	--	--	--	--	1
10. Integumentary System	15	---	3	---	---	---	---	---	---	---	---	---	--	--	---	--	2	--	---	--	--	--	--	--	5
Class VII. Orders.																									
1. Accident or Negligence	390	19	40	2	1	---	---	4	9	2	---	---	1	2	15	1	1	--	10	4	--	1	1	3	116
2. Homicide	7	1	3	---	---	---	---	---	---	---	---	---	--	--	---	--	--	--	1	--	--	--	--	--	5
3. Suicide	82	1	7	1	---	1	---	---	2	1	---	1	--	--	---	--	--	--	1	--	1	--	--	1	17
4. Execution	1	---	---	---	---	---	---	---	---	---	---	---	--	--	---	--	--	--	---	--	--	--	--	--	---
Class VIII. Orders.																									
1. Ill Defined	821	9	45	1	---	---	4	4	6	3	3	1	1	4	21	4	4	1	39	6	--	2	3	--	161
2. Cause not stated	56	1	---	---	---	---	---	---	2	---	---	---	--	--	---	--	--	--	---	--	--	--	--	--	3

TABLE VI.—Continued.

WINDHAM COUNTY.

CAUSES OF DEATH.	State.	Brooklyn.	Ashford.	Canterbury.	Chaplin.	Eastford.	Hampton.	Killingly.	Plainfield.	Pomfret.	Putnam.	Scotland.	Sterling.	Thompson.	Windham.	Woodstock.	Total.
CLASS I.—Zymotic Diseases.																	
ORDER 1. MIASMATIC.																	
Chicken Pox	1	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Measles	62	4	----	----	----	----	----	----	3	----	----	----	----	1	----	----	8
Scarlet Fever	81	----	----	----	----	----	----	----	----	1	----	----	----	----	----	----	1
Typhus Fever	8	----	----	----	----	----	----	----	----	----	----	----	----	----	----	3	3
Relapsing Fever	1	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Influenza	4	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Typhoid Fever	281	1	1	----	1	----	1	4	1	1	2	----	3	4	1	----	20
Cerebro-Spinal Fever	40	----	----	----	----	----	----	----	----	----	4	----	----	----	----	----	4
Continued Fever	37	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Whooping Cough	92	1	----	----	1	----	----	5	----	----	----	----	----	1	----	----	8
Diphtheria	584	----	----	----	----	----	----	----	2	----	26	----	----	3	----	4	35
Membranous Croup	133	1	----	----	----	----	----	----	----	----	7	----	----	----	----	1	9
Other Miasmatic Diseases	32	1	----	----	----	----	1	----	----	----	----	----	----	----	----	----	2

ORDER 2. DIARRHŒAL.																		
Cholera Infantum	506	----	----	----	----	----	----	7	6	1	6	----	----	7	18	1	46
Infantile Diarrhœa	257	4	----	----	----	----	----	5	1	----	7	----	----	5	1	----	23
Cholera Morbus	36	----	1	----	----	----	----	----	----	----	----	----	----	----	----	----	1
Dysentery	146	----	----	----	----	----	----	----	----	----	2	----	----	2	3	1	8
Diarrhœa	54	----	1	----	----	----	----	----	1	----	----	----	----	----	1	----	3
ORDER 3. MALARIAL.																	
Intermittent Fever	21	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	------
Remittent Fever	30	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	------
Pernicious or Congestive Fever	17	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	------
Other Malarial Diseases	49	----	----	----	----	1	----	----	----	----	----	----	----	----	----	----	1
ORDER 4. ZOOGENOUS.																	
Hydrophobia	1	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	------
Cow Pox and effects of Vaccination	------	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	------
ORDER 5. VENEREAL.																	
Syphilis	4	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	------
Gonorrhœa, Stricture of Urethra	2	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	------
Other Venereal Diseases	1	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	------
ORDER 6. SEPTIC.																	
Erysipelas	22	----	----	----	----	----	----	----	1	----	----	----	----	1	----	1	3
Pyæmia, Septicæmia	51	1	----	----	----	----	----	----	----	----	----	----	----	----	1	----	2
Puerperal Fever	49	----	----	----	----	----	----	----	----	----	----	----	----	----	3	----	3
CLASS II.—Parasitic Diseases.																	
Thrush	1	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	------
Other Parasitic Diseases	------	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	------
CLASS III.—Dietetic Diseases.																	
Intemperance	25	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	------
Chronic Alcoholism	23	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	------
Delirium Tremens	9	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	------

TABLE VI—CONTINUED. WINDHAM COUNTY.

CAUSES OF DEATH.	State.	Brooklyn.	Ashford.	Canterbury.	Chaplin.	Eastford.	Hampton.	Killingly.	Plainfield.	Pomfret.	Putnam.	Scotland.	Sterling.	Thompson.	Windham.	Woodstock.	Total.
CLASS IV.—Constitutional Diseases.																	
Rheumatism	103			1				1							1		3
Gout	2																
Rickets	5							1									1
Cancer of Breast	38				1			1			1						3
Cancer of Stomach	69						1	1			2						4
Cancer of Womb	49							2			1				1		4
Cancer of other organs	168							1	1	1	5	1			3	1	13
Tabes Mesenterica	75																
Tubercular Meningitis, Acute Hydroceph.	81										2				1		3
Phthisis	1459	5	3		1		1	14	11	3	13	2		8	18	4	83
Other forms of Tuberculosis	59								3		2			4	1		10
Scrofula	25							2									2
Pott's Disease	3																
Hip-Joint Disease	2																
Purpura	3							1									1
Anæmia	23		1											3	1		5
Diabetes	48						1	1		1					1		4
Other Constitutional Diseases	8																

CLASS V.—Developmental Diseases.																	
Premature Birth	217	----	1	----	----	----	1	1	----	----	7	----	1	3	2	----	16
Actelectasis	19	----	----	----	----	----	----	1	----	----	----	----	----	----	----	----	1
Cyanosis	23	----	----	----	----	----	1	----	----	----	----	----	----	----	----	----	1
Spina Bifida	10	----	----	----	----	----	----	1	----	----	----	----	----	----	----	----	1
Imperforate Anus	3	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Other Congenital malformations	15	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Umbilical Hemorrhage	9	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Old Age	704	3	4	3	----	----	----	13	----	3	3	2	2	3	8	8	52
CLASS VI.—Local Diseases.																	
ORDER 1. OF NERVOUS SYSTEM.																	
Inflammation of Brain or its Membranes	252	----	----	----	----	----	----	8	2	4	2	----	----	6	2	1	25
Apoplexy	498	----	----	1	----	----	1	4	2	1	4	----	1	4	10	1	29
Softening of Brain	56	----	1	----	----	----	----	----	----	----	1	----	1	----	2	----	5
Hydrocephalus, not acute	24	----	----	----	----	----	----	----	1	----	----	----	----	1	----	----	2
Hemiplegia	32	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Paralysis Agitans	40	----	----	----	----	2	----	----	----	2	----	----	----	----	----	2	6
Insanity	47	----	----	----	----	----	----	----	----	1	----	----	----	----	----	----	1
Chorea	4	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Epilepsy	39	----	----	----	1	----	----	1	----	----	----	----	----	----	1	----	3
Convulsions	287	1	----	----	----	----	----	2	----	----	1	----	----	1	----	1	6
Trismus Nascentium	9	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Tetanus	17	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Paraplegia	10	----	----	----	----	----	----	----	----	----	----	1	----	----	----	----	1
Diseases of Spinal Cord	23	----	----	----	----	----	----	----	1	----	----	----	----	----	----	----	1
Myelitis	16	----	----	----	----	----	----	----	1	----	----	----	----	----	----	----	1
Spinal Meningitis	30	----	----	----	----	----	----	1	----	----	1	----	----	1	----	1	4
Locomotor Ataxia	7	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Other Diseases of Nervous System	218	----	----	----	----	----	2	----	----	----	5	----	----	----	5	2	14

TABLE VI—CONTINUED. WINDHAM COUNTY.

CAUSES OF DEATH.	State.	Brooklyn.	Ashford.	Canterbury.	Chaplin.	Eastford.	Hampton.	Killingly.	Plainfield.	Pomfret.	Putnam.	Scotland.	Sterling.	Thompson.	Windham.	Woodstock.	Total.
ORDER 2. OF ORGANS OF SPECIAL SENSE.																	
Otitis	2																
ORDER 3. OF CIRCULATORY SYSTEM.																	
Endocarditis	63															1	1
Valvular Disease of Heart	176			1				13	3			1	1				19
Disease of Heart	403									7	3		1	7	13	2	33
Pericarditis	20																
Hypertrophy of Heart	34											1		1			2
Angina Pectoris	68							1			1						2
Syncope	9																
Aneurism	5																
Senile Gangrene	28																
Thrombosis, Embolism	41																
Phlebitis	4																
Other Diseases of Circulatory System	77	3							1		2			1	1		8

Order 4. Of Respiratory System.																	
Laryngitis	23																
Catarrhal Croup	6													2			2
Other Diseases of Larynx or Trachea	3																
Emphysema, Asthma	32							1		1					5		7
Bronchitis	324							7		3	4				1		15
Pneumonia	915	5	3			3	1	12	11		9	2	1	10	10	9	76
Pleurisy	38							1	1	1							3
Other Diseases of Respiratory System	38	1						1	1		1						4
Order 5. Of Digestive System.																	
Stomatitis	3																
Dentition	45										2			1	1		4
Quinsy	5																
Dyspepsia	13																
Hæmatemesis	12								1								1
Disease of Stomach	86		1						1	1		2			4		9
Ulcer of Stomach	22																
Enteritis	112								1	1						1	3
Ulceration of Intestines	9													1			1
Obstruction of Intestines	25																
Strangulation of Intestines	1																
Intussusception of Intestines	7																
Hernia	23											2			1		3
Fistula	1																
Peritonitis (not puerperal)	122	1						1	1					3	1		7
Ascites	7																
Gallstones	2																
Cirrhosis of Liver	63															2	2
Other Diseases of Liver	40				1			1						1		3	6
Hepatitis	29																
Jaundice	15							1									1
Other Diseases of Digestive System	20								1						2		3

TABLE VI—CONTINUED. WINDHAM COUNTY.

CAUSES OF DEATH.	State.	Brooklyn.	Ashford.	Canterbury.	Chaplin.	Eastford.	Hampton.	Killingly.	Plainfield.	Pomfret.	Putnam.	Scotland.	Sterling.	Thompson.	Windham.	Woodstock.	Total.
ORDER 6. OF LYMPHATIC SYSTEM AND DUCTLESS GLANDS.																	
Addison's Disease	6	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	------
Diseases of Lymphatic System	2	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	------
ORDER 7. OF URINARY SYSTEM.																	
Nephritis	79	----	----	----	----	----	----	----	----	----	2	----	----	----	----	----	2
Bright's Disease	281	1	1	----	----	----	----	3	----	----	1	----	----	1	7	1	15
Uræmia	34	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	------
Suppression of Urine	3	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	------
Calculus	3	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	------
Hæmaturia	6	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	------
Disease of Bladder	40	----	----	----	----	----	----	1	----	----	1	1	----	----	----	----	3
Prostatitis	14	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	------
Other Diseases of Urinary System	10	----	----	1	----	----	----	----	----	----	----	----	----	----	----	----	1

ORDER 8. OF GENERATIVE SYSTEM.																	
A. Diseases of the Reproductive Organs.																	
Diseases of the Uterus	9								1								1
Metritis	6																
Disease of Ovaries	17											1	1		1		3
Disorders of Menstruation	1																
Menorrhagia	1																
Perineal Abscess	2																
B. Diseases of Parturition.																	
Abortion and Miscarriage	7																
Puerperal Mania	2																
Puerperal Convulsions	16												1	1	1		3
Puerperal Hemorrhage	7									1				1			2
Placenta Previa	2																
Other Accidents of Childbirth	35													2	4		6
ORDER 9. OF ORGANS OF LOCOMOTION.																	
Caries, Necrosis	9																
Arthritis, Periostitis	4								1								1
Other Diseases of Organs of Locomotion	1																
ORDER 10. OF INTEGUMENTARY SYSTEM.																	
Bedsores	1																
Other Diseases of Integumentary System	14							1									1

TABLE VI—CONTINUED. WINDHAM COUNTY.

CAUSES OF DEATH.	STATE.	Brooklyn.	Ashford.	Canterbury.	Chaplin.	Eastford.	Hampton.	Killingly.	Plainfield.	Pomfret.	Putnam.	Scotland.	Sterling.	Thompson.	Windham.	Woodstock.	TOTAL.
CLASS VII.—Violence.																	
ORDER 1. ACCIDENT AND NEGLIGENCE.																	
Fractures and Contusions	46	----	----	----	----	----	----	1	----	----	----	----	----	----	1	----	2
Fractures and Contusions of Skull	20	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Railroad Injuries	134	----	----	----	----	----	----	----	2	----	1	----	1	2	2	----	8
Gun-shot Wound	12	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Burns and Scalds	30	----	----	----	----	2	----	----	----	----	----	----	----	----	1	----	3
Poisoned	12	----	----	----	----	----	----	1	----	----	----	----	----	----	----	1	2
By Arsenic	1	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Drowning	89	1	----	----	----	----	----	1	----	----	1	----	----	2	2	----	7
Suffocation	17	----	----	----	----	----	----	2	----	----	----	----	----	----	----	----	2
Other Accidents	82	1	----	----	----	----	----	----	1	----	1	----	1	1	1	----	6
Falling	47	----	----	----	----	----	2	1	----	----	----	----	----	----	----	1	4
ORDER 2. HOMICIDE.																	
Murder	2	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Manslaughter	5	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

ORDER 3. SUICIDE.																	
Gun-shot Wounds	13	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Cut, Stab	4	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Poisoned	17	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
By Opium	8	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Drowning	20	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Hanging	16	----	----	1	----	----	----	----	----	----	----	----	----	----	----	----	1
Otherwise	4	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
ORDER 4. EXECUTION.																	
Hanging	1	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
CLASS VIII.—Unclassified.																	
Tumor	19	----	----	----	----	----	----	1	----	----	----	----	----	----	1	----	2
Dropsy	83	----	----	----	2	----	----	----	----	1	----	----	----	1	2	----	6
Debility, Atrophy, Inanition	302	----	----	----	----	----	----	6	----	----	3	----	----	2	1	----	12
Sunstroke	3	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Exhaustion	89	----	----	----	----	1	----	2	5	----	2	----	----	----	2	1	13
Hemorrhage	32	----	----	----	----	----	----	----	----	----	----	----	----	----	2	----	2
Abscess	25	----	----	----	----	----	----	1	----	----	----	----	----	1	----	----	2
Sudden Death	15	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Other ill-defined causes	253	1	----	2	----	----	----	----	1	----	3	----	----	10	7	1	25
Cause not stated	56	2	----	----	----	----	----	1	----	----	4	----	----	----	3	----	10

RECAPITULATION OF WINDHAM COUNTY.

CLASSIFIED DISEASES.	State.	Brooklyn.	Ashford.	Canterbury.	Chaplin.	Eastford.	Hampton.	Killingly.	Plainfield.	Pomfret.	Putnam.	Scotland.	Sterling.	Thompson.	Windham.	Woodstock.	Total.
All causes	12529	38	18	10	8	9	13	139	70	35	145	16	15	109	162	55	842
CLASSES.																	
I. Zymotic Diseases	2602	13	3	----	2	1	2	21	15	3	54	----	3	24	28	11	180
II. Parasitic Diseases	1	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	------
III. Dietetic Diseases	57	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	------
IV. Constitutional Diseases	2220	5	4	1	2	----	3	25	15	5	26	3	----	15	27	5	136
V. Developmental Diseases	1000	3	5	3	----	----	2	16	----	3	10	2	3	6	10	8	71
VI. Local Diseases	5192	12	6	3	2	5	4	60	31	23	40	11	7	45	72	27	348
VII. Violence	580	2	----	1	----	2	2	6	3	----	3	----	2	5	7	2	35
VIII. Ill Defined and Cause not stated	877	3	----	2	2	1	----	11	6	1	12	----	----	14	18	2	72
Class I. Orders.																	
1. Miasmatic Diseases	1356	8	1	----	2	----	2	9	6	2	39	----	3	9	1	8	90
2. Diarrhœal Diseases	999	4	2	----	----	----	----	12	8	1	15	----	----	14	23	2	81
3. Malarial Diseases	117	----	----	----	----	1	----	----	----	----	----	----	----	----	----	----	1
4. Zoogenous Diseases	1	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	------
5. Venereal Diseases	7	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	------
6. Septic Diseases	122	1	----	----	----	----	----	----	1	----	----	----	----	1	4	1	8
Class II. Orders.																	
Parasitic Diseases	1	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	------

Class III. Orders.																	
Dietetic Diseases	57	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	------
Class IV. Orders.																	
Constitutional Diseases	2220	5	4	1	2	----	3	25	15	5	26	3	----	15	27	5	136
Class V. Orders.																	
Developmental Diseases	1000	3	5	3	----	----	2	16	----	3	10	2	3	6	10	8	71
Class VI. Orders.																	
1. Diseases of Nervous System	1609	1	1	1	1	2	3	16	7	8	14	1	2	13	20	8	98
2. Organs of Special Sense	2	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	------
3. Circulatory System	928	3	----	1	----	----	----	14	4	7	6	2	2	9	14	3	65
4. Respiratory System	1379	6	3	----	----	3	1	22	13	5	14	2	1	12	16	9	107
5. Digestive System	662	1	1	----	1	----	----	3	5	2	2	4	----	6	9	6	40
6. Lymphatic Syst. and Ductless Glands	8	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	------
7. Urinary System	470	1	1	1	----	----	----	4	----	----	4	1	----	1	7	1	21
8. Generative System	105	----	----	----	----	----	----	----	1	1	----	1	2	4	6	----	15
9. Organs of Locomotion	14	----	----	----	----	----	----	----	1	----	----	----	----	----	----	----	1
10. Integumentary System	15	----	----	----	----	----	----	1	----	----	----	----	----	----	----	----	1
Class VII. Orders.																	
1. Accident or Negligence	390	2	----	----	----	2	2	6	3	----	3	----	2	5	7	2	34
2. Homicide	7	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	------
3. Suicide	82	----	----	1	----	----	----	----	----	----	----	----	----	----	----	----	1
4. Execution	1	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	------
Class VIII. Orders.																	
1. Ill Defined	821	1	----	2	2	1	----	10	6	1	8	----	----	14	15	2	62
2. Cause not stated	56	2	----	----	----	----	----	1	----	----	4	----	----	----	3	----	10

TABLE VI.—Continued.

LITCHFIELD COUNTY.

CAUSES OF DEATH.	State	Litchfield.	Barkhamsted.	Bethlehem.	Bridgewater.	Canaan.	Colebrook.	Cornwall.	Goshen.	Harwinton	Kent.	Morris.	New Hartford.	New Milford.	Norfolk.	North Canaan.	Plymouth.	Roxbury.	Salisbury.	Sharon.	Thomaston.	Torrington.	Warren.	Washington.	Watertown.	Winchester.	Woodbury.	Total.
CLASS I.—Zymotic Diseases.																												
ORDER 1. MIASMATIC.																												
Chicken Pox	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Measles	62	---	---	---	---	---	---	---	---	---	---	---	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1
Scarlet Fever	81	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1	---	---	---	---	---	---	---	1
Typhus Fever	8	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Relapsing Fever	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Influenza	4	---	---	---	---	---	---	---	---	---	---	---	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1
Typhoid Fever	281	---	---	---	---	1	---	1	---	1	---	---	1	2	1	4	1	---	1	2	1	3	1	---	---	---	1	21
Cerebro-Spinal Fever	40	---	---	---	---	---	1	---	---	---	---	---	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2
Continued Fever	37	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1	---	---	---	---	---	---	1
Whooping Cough	92	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1	1
Diphtheria	584	---	---	---	---	1	6	---	---	---	---	---	---	2	---	---	---	---	1	---	---	1	---	---	---	4	---	15
Membranous Croup	133	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1	---	---	---	---	---	---	---	---	---	---	---	1
Other Miasmatic Diseases	32	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

ORDER 2. DIARRHŒAL.																												
Cholera Infantum	506				1						2		10				1	1	2	1	4	5	1		1	4	1	34
Infantile Diarrhœa	257	2											2								1							4
Cholera Morbus	36					1							1															2
Dysentery	146										2	1			1						3			1	1	2	1	12
Diarrhœa	54	1																1								2		4
ORDER 3. MALARIAL.																												
Intermittent Fever	21																											
Remittent Fever	30													1					1						1			3
Pernicious or Congestive Fever	17																											
Other Malarial Diseases	49										2																	2
ORDER 4. ZOOGENOUS.																												
Hydrophobia	1																											
Cow Pox and effects of Vaccination																												
ORDER 5. VENEREAL.																												
Syphilis	4																											
Gonorrhœa, Stricture of Uretha	2																											
Other Venereal Diseases	1																											
ORDER 6. SEPTIC.																												
Erysipelas	21																											
Pyæmia, Septicæmia	51	3															1											4
Puerperal Fever	49																	1	1								1	3
CLASS II.—Parasitic Diseases.																												
Thrush	1																											
Other Parasitic Diseases																												
CLASS III.—Dietetic Diseases.																												
Intemperance	25											1														1		2
Chronic Alcoholism	23																		2		2							4
Delirium Tremens	9	1																										1

TABLE VI—CONTINUED. LITCHFIELD COUNTY.

CAUSES OF DEATH.	State.	Litchfield.	Barkhamsted.	Bethlehem.	Bridgewater.	Canaan.	Colebrook.	Cornwall.	Goshen.	Harwinton.	Kent.	Morris.	New Hartford.	New Milford.	Norfolk.	North Canaan.	Plymouth.	Roxbury.	Salisbury.	Sharon.	Thomaston.	Torrington.	Warren.	Washington.	Watertown.	Winchester.	Woodbury.	Total.
CLASS IV.—Constitutional Diseases.																												
Rheumatism	103					1		1				1		1		1					2	1						8
Gout	2																											
Rickets	5																											
Cancer of Breast	38					1								1	1	2		1					1	1				8
Cancer of Stomach	69	1					1	1	1			1		1														6
Cancer of Womb	49		1	1								1						1		1					1			6
Cancer of other organs	168		1											2			2	2			2		2			2	2	15
Tabes Mesenterica	75																				1							1
Tubular Meningitis, Acute Hydrocepl	81	1				1																						2
Phthisis	1459	4	2	1	1	2	4	1		3	2	1	9	6	1	1	4	2	6	4	6	9		3	7	10	3	92
Other forms of Tuberculosis	59	1																								2		3
Scrofula	25																											
Pott's Disease	3																											
Hip-Joint Disease	2																											
Purpura	3																											
Anæmia	23																					1						1
Diabetes	48		1					1											1			1				1		5
Other Constitutional Diseases	8																											

CLASS V.—Developmental Diseases.																												
Premature Birth	217	2				1	1						1		2								2	3				12
Atelectasis	19																				1							1
Cyanosis	23								1													2						3
Spina Bifida	10																											
Imperforate Anus	3																											
Other Congenital malformations	15																											
Umbilical Hemorrhage	9														1													1
Old Age	704	7	3		1	1	3		3	2	1		3	1	1				5	3	4	1			4	3	1	47
CLASS VI.—Local Diseases.																												
ORDER 1. OF NERVOUS SYSTEM.																												
Inflammation of Brain or its Membranes	252												2				1	1	1	1	2					1		9
Apoplexy	498	2			4	1	1	2	2	5			1	2		1	4	1	3	1		3	3		2	8	1	47
Softening of Brain	56					1													1	1	1				1	1		6
Hydrocephalus, not acute	24																											
Hemiplegia	32			1																								1
Paralysis Agitans	40				1						1		4		1													7
Insanity	47																											
Chorea	4																											
Epilepsy	39					1												1								1		3
Convulsions	287										1		2				1		1	1	2	1			1	1		11
Trismus Nascentium	9																											
Tetanus	17																											
Paraplegia	10																											
Diseases of Spinal Cord	23																											
Myelitis	16												1															1
Spinal Meningitis	30													1						1						1		3
Locomotor Ataxia	7																					1						1
Other Diseases of Nervous System	218	2		1		1				1				6					2		1	1			1	3	1	20

TABLE VI—CONTINUED. LITCHFIELD COUNTY.

CAUSES OF DEATH.	State.	Litchfield.	Barkhamsted.	Bethlehem.	Bridgewater.	Canaan.	Colebrook.	Cornwall.	Goshen.	Harwinton.	Kent.	Morris.	New Hartford.	New Milford.	Norfolk.	North Canaan.	Plymouth.	Roxbury.	Salisbury.	Sharon.	Thomaston.	Torrington.	Warren.	Washington.	Watertown.	Winchester.	Woodbury.	Total.
ORDER 2. OF ORGANS OF SPECIAL SENSE.																												
Otitis	2																											
ORDER 3. OF CIRCULATORY SYSTEM.																												
Endocarditis	63																										2	2
Valvular Disease of Heart	176			2		1		1						1			2		6				1					14
Disease of Heart	403				1		2							2					1		2		1			2		11
Pericarditis	20		1					1																				2
Hypertrophy of Heart	34														1					2						1		4
Angina Pectoris	68		1		1			1				1										1						5
Syncope	9														1													1
Aneurism	5																											
Senile Gangrene	28																									1		1
Thrombosis, Embolism	41																1											1
Phlebitis	4																											
Other Diseases of Circulatory System	77	1																		2		2		8	2			15

Order 4. Of Respiratory System.																												
Laryngitis	23						1							1														2
Catarrhal Croup	6																											
Other Diseases of Larynx or Trachea	3	1																										1
Emphysema Asthma	32							1																				1
Bronchitis	324				1	1	1						2	2	1					1		3	1					13
Pneumonia	915	2	3	1		1	2			1	3		6	3	1	4	1	5	8	4	3	4			2	1	5	60
Pleurisy	38														1							1				3		5
Other Diseases of Respiratory System	38	1																										1
Order 5. Of Digestive System.																												
Stomatitis	3																					1						1
Dentition	45													1														1
Quinsy	5																											
Dyspepsia	13																1											1
Hæmatemesis	12																											
Disease of Stomach	86						1							1					1			1		1				5
Ulcer of Stomach	22														1													1
Enteritis	112												1		1			1	1		2	1						7
Ulceration of Intestines	9				1																							1
Obstruction of Intestines	25	1			1											1												3
Strangulation of Intestines	1																											
Intus-usception	7													1														1
Hernia	23																					1					1	2
Fistula	1																											
Peritonitis not puerperal)	122								1				1	1							1				1			5
Ascites	7													1														1
Gallstones	2																											
Cirrhosis of Liver	63	3				1								1							1				1			7
Other Diseases of Liver	40				1						1																	2
Hepatitis	29		2																									2
Jaundice	15								1		2																	3
Other Diseases of Digestive System	20	1																	1									2

TABLE VI—CONTINUED. LITCHFIELD COUNTY.

CAUSES OF DEATH.	STATE.	Litchfield.	Barkhamsted.	Bethlehem.	Bridgewater.	Canaan.	Colebrook.	Cornwall.	Goshen.	Harwinton.	Kent.	Morris.	New Hartford.	New Milford.	Norfolk.	North Canaan.	Plymouth.	Roxbury.	Salisbury.	Sharon.	Thomaston.	Torrington.	Warren.	Washington.	Watertown.	Winchester.	Woodbury.	TOTAL.
ORDER 6. OF LYMPHATIC SYSTEM AND DUCTLESS GLANDS.																												
Addison's Disease	6	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1
Diseases of Lymphatic System	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
ORDER 7. OF URINARY SYSTEM.																												
Nephritis	79	1	---	---	---	---	---	---	---	---	---	---	---	1	---	---	---	---	2	---	---	1	---	---	---	---	---	5
Bright's Disease	281	2	1	---	---	---	---	---	---	---	1	---	1	---	---	---	2	---	2	2	1	6	---	1	2	7	---	28
Uræmia	34	---	1	---	---	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2
Suppression of Urine	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Calculus	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1	---	1
Hæmaturia	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Disease of Bladder	40	---	---	---	---	---	---	---	---	---	---	---	---	4	1	---	---	---	---	---	---	---	---	---	---	---	---	5
Prostatitis	14	2	---	1	---	---	---	---	---	---	---	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	4
Other Diseases of Urinary System	10	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

ORDER 8. OF GENERATIVE SYSTEM.																												
A. Diseases of the Reproductive Organs.																												
Diseases of the Uterus	9													1														1
Metritis	6																											
Disease of Ovaries	17		1																			1						2
Disorders of Menstruation	1																				1							1
Menorrhagia	1																											
Perineal Abscess	2																											
B. Diseases of Parturition.																												
Abortion and Miscarriage	7																											
Puerperal Mania	2																			1								1
Puerperal Convulsions	16																											
Puerperal Hemorrhage	7		1																									1
Placenta Previa	2																											
Other Accidents of Childbirth	35		1															3						1	1			6
ORDER 9. OF ORGANS OF LOCOMOTION.																												
Caries, Necrosis	9	1																				1			1			3
Arthritis, Periostitis	4																											
Other Diseases of Organs of Locomotion	1																											
ORDER 10. OF INTEGUMENTARY SYSTEM.																												
Bedsores	1																							1				1
Other Diseases of Integumentary System	14																											

TABLE VI—CONTINUED. LITCHFIELD COUNTY.

CAUSES OF DEATH.	STATE.	Litchfield.	Barkhamsted.	Bethlehem.	Bridgewater.	Canaan.	Colebrook.	Cornwall.	Goshen.	Harwinton.	Kent.	Morris.	New Hartford.	New Milford.	Norfolk.	North Canaan.	Plymouth.	Roxbury.	Salisbury.	Sharon.	Thomaston.	Torrington.	Warren.	Washington.	Watertown.	Winchester.	Woodbury.	TOTAL.
CLASS VII.—Violence.																												
ORDER 1. ACCIDENT AND NEGLIGENCE.																												
Fractures and Contusions	46																		1	1								2
Fractures and Contusions of Skull	20	1						1														1						3
Railroad Injuries	134		1			1							1	2														5
Gunshot Wound	12													1														1
Burns and Scalds	30																				1							1
Poisoned	12		1							1												1						3
By Arsenic	1																											
Drowning	89		1			1					1									1		1	1					6
Suffocation	17																									1		1
Other Accidents	82		1				2						1					1										5
Falling	47														1								1					2
ORDER 2. HOMICIDE.																												
Murder	2																											
Manslaughter	5																											

ORDER 3. SUICIDE.																											
Gun-shot Wounds	13	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Cut, Stab	4	1	---	---	---	---	---	---	---	---	1	---	---	---	---	---	---	---	---	---	---	---	---	---	1	---	3
Poisoned	17	---	---	---	---	---	---	---	---	---	---	---	---	1	---	---	---	---	---	---	---	---	---	---	---	---	1
By Opium	8	---	---	---	---	---	---	---	---	---	---	---	1	---	---	---	---	---	---	---	---	---	---	---	---	---	1
Drowning	20	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1	---	---	---	---	---	---	---	---	---	1
Hanging	16	---	---	---	---	---	---	---	---	1	---	---	---	1	---	---	---	---	---	---	1	---	---	---	---	---	3
Otherwise	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
ORDER 4. EXECUTION.																											
Hanging	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
CLASS VIII.—Unclassified.																											
Tumor	19	---	---	---	---	---	---	---	---	---	---	---	---	1	---	---	---	---	---	---	---	---	---	---	---	---	1
Dropsy	83	---	---	---	---	1	---	1	---	---	---	---	2	---	1	---	---	---	---	---	---	---	---	---	2	---	7
Debility, Atrophy, Inanition	302	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1	3	---	---	---	---	---	---	5	---	9
Sunstroke	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Exhaustion	89	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	3	---	3
Hemorrhage	32	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1	---	---	---	---	---	1
Abscess	25	---	1	---	---	---	---	---	---	---	---	---	1	---	---	---	---	---	---	---	---	---	---	---	---	---	2
Sudden Death	15	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Other ill-defined causes	253	2	---	---	---	---	---	---	---	---	1	---	1	1	---	3	1	---	2	---	---	5	---	---	1	3	---	20
Cause not stated	56	---	---	---	---	---	---	---	---	---	---	---	1	1	1	---	---	1	---	3	---	---	---	---	---	---	7

RECAPITULATION OF LITCHFIELD COUNTY.

CLASSIFIED DISEASES.	State.	Litchfield.	Barkhamsted.	Bethlehem.	Bridgewater.	Canaan.	Colebrook.	Cornwall.	Goshen.	Harwinton.	Kent.	Morris.	New Hartford.	New Milford.	Norfork.	North Canaan.	Plymouth.	Roxbury.	Salisbury.	Sharon.	Thomaston.	Torrington.	Warren.	Washington.	Watertown.	Winchester.	Woodbury.	Total.
All causes	12529	49	24	8	14	22	26	13	9	15	21	8	59	55	20	18	25	26	53	34	46	64	13	19	34	78	21	774
CLASSES.																												
I. Zymotic Diseases	2602	6	---	---	1	3	7	1	--	1	6	1	17	5	2	5	3	3	6	4	10	9	2	1	3	12	5	113
II. Parasitic	1	---	---	---	---	---	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	---
III. Dietitic	57	1	---	---	---	---	--	--	--	--	--	1	--	--	--	--	--	--	2	--	2	--	--	--	--	1	--	7
IV. Constitutional	2220	7	5	2	1	5	5	4	1	3	2	4	9	11	2	4	6	6	7	5	11	12	3	4	8	15	5	147
V. Developmental	1000	9	3	---	1	2	4	--	4	2	1	--	4	1	4	--	--	--	5	3	5	3	--	2	7	3	1	64
VI. Local	5192	22	11	6	11	9	8	6	4	7	9	2	21	30	9	6	13	12	30	17	17	30	6	12	15	32	10	355
VII. Violence	588	2	4	---	---	2	2	1	--	2	2	--	3	5	1	--	1	1	1	2	1	4	2	--	--	2	--	38
VIII. Ill Defined and Cause not stated	877	2	1	---	---	1	--	1	--	--	1	--	5	3	2	3	2	4	2	3	--	6	--	--	1	13	--	50
Class I. Orders.																												
1. Miasmatic Diseases	1356	---	---	---	---	2	7	1	--	1	--	--	4	4	1	5	1	--	2	3	2	4	1	--	--	4	2	44
2. Diarrhœal Diseases	999	3	---	---	1	1	--	--	--	--	4	1	13	--	1	--	1	2	2	1	8	5	1	1	2	8	2	57
3. Malarial Diseases	117	---	---	---	---	---	--	--	--	--	2	--	--	1	---	---	--	--	1	---	--	--	--	--	1	--	--	5
4. Zoogenous Diseases	1	---	---	---	---	---	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	---
5. Venereal Diseases	7	---	---	---	---	---	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	---
6. Septic Diseases	122	3	---	---	---	---	--	--	--	--	--	--	--	--	--	--	1	1	1	--	--	--	--	--	--	--	1	7
Class II. Orders.																												
Parasitic Diseases	1	---	---	---	---	---	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	---

Class III. Orders.																											
Dietetic Diseases	57	1	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	2	--	2	--	--	--	--	1	--	7
Class IV. Orders.																											
Constitutional Diseases	2220	7	5	2	1	5	5	4	1	3	2	4	9	11	2	4	6	6	7	5	11	12	3	4	8	15	5	147
Class V. Orders.																											
Developmental Diseases	1000	9	3	--	1	2	4	--	4	2	1	--	4	1	4	--	--	--	5	3	5	3	--	2	7	3	1	64
Class VI. Orders.																											
1. Diseases of Nervous System	1609	4	--	2	5	4	1	2	2	6	2	--	10	9	1	1	6	3	8	5	6	6	3	--	5	16	2	109
2. Organs of Special Sense	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	----
3. Circulatory System	928	1	2	2	2	1	2	3	--	--	--	1	--	3	2	--	3	--	7	4	2	3	2	8	2	4	2	56
4. Respiratory System	1379	4	3	1	1	2	4	1	--	1	3	--	8	6	3	4	1	5	8	5	3	8	1	--	2	4	5	83
5. Digestive System	662	5	2	--	3	1	1	--	2	--	3	--	2	6	2	1	1	1	3	--	4	4	--	1	2	--	1	45
6. Lymphatic Syst. and Ductless Glands	8	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1
7. Urinary System	470	5	2	1	--	1	--	--	--	--	1	1	1	5	1	--	2	--	4	2	1	7	--	1	2	8	--	45
8. Generative System	105	1	2	--	--	--	--	--	--	--	--	--	--	1	--	--	--	3	--	1	1	1	--	1	1	--	--	12
9. Organs of Locomotion	14	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	1	--	--	3
10. Integumentary System	15	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	1
Class VII. Orders.																											
1. Accident or Negligence	390	1	4	--	--	2	2	1	--	1	1	--	2	3	1	--	--	1	1	2	1	3	2	--	--	1	--	29
2. Homicide	7	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	----
3. Suicide	82	1	--	--	--	--	--	--	--	1	1	--	1	2	--	--	1	--	--	--	--	1	--	--	--	1	--	9
4. Execution	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	----
Class VIII. Orders.																											
1. Ill Defined	821	2	1	--	--	1	--	1	--	--	1	--	4	2	1	3	2	3	2	--	--	6	--	--	1	13	--	43
2. Cause not stated	56	--	--	--	--	--	--	--	--	--	--	--	1	1	1	--	--	1	--	3	--	--	--	--	--	--	--	7

TABLE VI—Continued.

MIDDLESEX COUNTY.

CAUSES OF DEATH.	State.	Middletown.	Haddam.	Chatham.	Chester.	Clinton.	Cromwell.	Durham.	East Haddam.	Essex.	Killingworth.	Middlefield.	Old Saybrook.	Portland.	Saybrook.	Westbrook.	Total.
CLASS I.—Zymotic Diseases.																	
ORDER I. MIASMATIC.																	
Chicken Pox	1																
Measles	62						1										1
Scarlet Fever	81	2															2
Typhus Fever	8																
Relapsing Fever	1																
Influenza	4																
Typhoid Fever	281		1		1		1	1						2			6
Cerebro-Spinal Fever	40																
Continued Fever	37	1															1
Whooping Cough	92	1															1
Diphtheria	584	7		1		2										1	11
Membranous Croup	133	1					2		1					7			11
Other Miasmatic Diseases	32													1			1

ORDER 2. DIARRHŒAL.																	
Cholera Infantum	506	6	1				1		3				1	9			21
Infantile Diarrhœa	257		1	1					2	1			2			1	8
Cholera Morbus	36												1				1
Dysentery	146	5		1	2								1	5			14
Diarrhœa	54	2											1				3
ORDER 3. MALARIAL.																	
Intermittent Fever	21	1															1
Remittent Fever	30	1															1
Pernicious or Congestive Fever	17		2			1											3
Other Malarial Diseases	49													1	1		2
ORDER 4. ZOOGENOUS.																	
Hydrophobia	1																
Cow Pox and effects of Vaccination																	
ORDER 5. VENEREAL.																	
Syphilis	4																
Gonorrhœa, Stricture of Urethra	2																
Other Venereal Diseases	1																
ORDER 6. SEPTIC.																	
Erysipelas	21			1									1				2
Pyæmia, Septicæmia	51	1										1					2
Puerperal Fever	49	2					1					1					4
CLASS II.—Parasitic Diseases.																	
Thrush	1																
Other Parasitic Diseases																	
CLASS III.—Dietetic Diseases.																	
Intemperance	25																
Chronic Alcoholism	23	1															1
Delirium Tremens	9	1															1

TABLE VI—CONTINUED. MIDDLESEX COUNTY.

CAUSES OF DEATH.	State.	Middletown.	Haddam.	Chatham.	Chester.	Clinton.	Cromwell.	Durham.	East Haddam.	Essex.	Killingworth.	Middlefield.	Old Saybrook.	Portland.	Saybrook.	Westbrook.	Total.
CLASS IV.—Constitutional Diseases.																	
Rheumatism	103						1					1					2
Gout	2			1													1
Rickets	5																
Cancer of Breast	38	2				1											3
Cancer of Stomach	69	1			1				2						1		5
Cancer of Womb	49	3								1			1				5
Cancer of other organs	168	2	3	1	1		1	2	1			2		1			14
Tabes Mesenterica	75	5	1	1			1							5			13
Tubercular Meningitis, Acute Hydrocephalus	81	3															3
Phthisis	1459	48	4	1	4	2	5	1	5	1		3		7	1	1	83
Other forms of Tuberculosis	59	1						1									2
Scrofula	25						1										1
Pott's Disease	3																
Hip-Joint Disease	2								1								1
Purpura	3																
Anæmia	23	1								1							2
Diabetes	48	1								1						1	3
Other Constitutional Diseases	8																

CLASS V.—Developmental Diseases.																	
Premature Birth	217	1	1			1	2						1	2			8
Atelectasis	19																
Cyanosis	23	1															1
Spina Bifida	10																
Imperforate Anus	3																
Other Congenital malformations	15		1						1								2
Umbilical Hemorrhage	9																
Old Age	704	31	8		1	2	3	1	4		1		1	11	1	2	66
CLASS VI.—Local Diseases.																	
ORDER 1. OF NERVOUS SYSTEM.																	
Inflammation of Brain or its Membranes	252	7							2				1		2		12
Apoplexy	498	17	1		1	1	3		2	3	2	3	1	1	2		37
Softening of Brain	56												1				1
Hydrocephalus, not acute	24			1												1	2
Hemiplegia	32	6				3										1	10
Paralysis Agitans	40										1		1	3			5
Insanity	47	12					1				1						14
Chorea	4	1															1
Epilepsy	39	4															4
Convulsions	287		2	2	1	1			1			1		1	1		10
Trismus Nascentium	9	1															1
Tetanus	17		1										1	1			3
Paraplegia	10	1															1
Diseases of Spinal Cord	23			1			2										3
Myelitis	16																
Spinal Meningitis	30												1				1
Locomotor Ataxia	7																
Other Diseases of Nervous System	218	8		2	3				2								15

TABLE VI—CONTINUED. MIDDLESEX COUNTY.

CAUSES OF DEATH.	State.	Middletown.	Haddam.	Chatham.	Chester.	Clinton.	Cromwell.	Durham.	East Haddam.	Essex.	Killingworth.	Middlefield.	Old Saybrook.	Portland.	Saybrook.	Westbrook.	Total.
ORDER 2. OF ORGANS OF SPECIAL SENSE.																	
Otitis	2	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	------
ORDER 3. OF CIRCULATORY SYSTEM.																	
Endocarditis	63	----	----	----	----	1	----	----	----	----	----	----	----	----	----	----	1
Valvular Disease of Heart	176	7	----	1	----	----	----	----	5	1	----	----	1	2	----	1	18
Disease of Heart	403	14	1	4	----	----	----	----	----	----	----	----	----	7	----	----	26
Pericarditis	20	1	----	----	----	----	----	----	----	----	----	----	1	----	----	----	2
Hypertrophy of Heart	34	4	----	----	----	----	----	----	----	----	----	----	----	----	----	----	4
Angina Pectoris	68	3	----	1	----	----	----	----	----	----	----	----	----	----	2	----	6
Syncope	9	----	----	----	----	----	----	----	----	1	----	----	----	----	----	----	1
Aneurism	5	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	------
Senile Gangrene	28	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	------
Thrombosis, Embolism	41	----	----	----	----	1	1	----	1	----	----	----	----	----	----	----	3
Phlebitis	4	----	----	----	----	----	----	----	----	----	----	----	----	----	1	----	1
Other Diseases of Circulatory System	77	1	----	----	----	1	----	----	----	----	2	1	----	----	----	----	5

ORDER 4. OF RESPIRATORY SYSTEM.																	
Laryngitis	23																
Catarrhal Croup	6																
Other Diseases of Larynx or Trachea	3																
Emphysema, Asthma	32																
Bronchitis	324	4		1			1		1		1		3	4	1		16
Pneumonia	915	16	5	1			3	1	6	4		1	1	5	1		44
Pleurisy	38	2															2
Other Diseases of Respiratory System	38																
ORDER 5. OF DIGESTIVE SYSTEM.																	
Stomatitis	3																
Dentition	45	2												1			3
Quinsy	5																
Dyspepsia	13																
Hæmatemesis	12									1				1			2
Disease of Stomach	86	4						1						1			6
Ulcer of Stomach	22																
Enteritis	112	4							1					2			7
Ulceration of Intestines	9										1						1
Obstruction of Intestines	25																
Strangulation of Intestines	1																
Intussusception of Intestines	7																
Hernia	23	1															1
Fistula	1																
Peritonitis (not puerperal)	122	2		1			1							2		1	7
Ascites	7																
Gallstones	2																
Cirrhosis of Liver	63																
Other Diseases of Liver	40	1									1						2
Hepatitis	29	1															1
Jaundice	15																
Other Diseases of Digestive System	20													1			1

TABLE VI—CONTINUED. MIDDLESEX COUNTY.

CAUSES OF DEATH.	STATE.	Middletown.	Haddam.	Chatham.	Chester.	Clinton.	Cromwell.	Durham.	East Haddam.	Essex.	Killingworth.	Middlefield.	Old Saybrook.	Portland.	Saybrook.	Westbrook.	TOTAL.
ORDER 6. OF LYMPHATIC SYSTEM AND DUCTLESS GLANDS.																	
Addison's Disease	6	----	----	1	----	----	----	----	----	----	----	----	----	----	----	----	1
Diseases of Lymphatic System	2	----	----	1	----	----	----	----	----	----	----	----	----	----	----	----	1
ORDER 7. OF URINARY SYSTEM.																	
Nephritis	79	----	----	----	----	----	----	----	----	----	----	----	1	----	----	----	1
Bright's Disease	281	8	----	1	----	1	1	----	4	----	1	----	2	2	----	----	20
Uræmia	34	----	----	----	----	----	----	1	----	----	----	----	----	----	----	----	1
Suppression of Urine	3	----	----	----	----	----	----	----	----	----	----	----	----	1	----	----	1
Calculus	3	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Hæmaturia	6	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Disease of Bladder	40	1	----	----	----	1	----	----	----	----	----	----	1	----	----	----	3
Prostatitis	14	----	----	1	----	----	----	----	----	----	----	----	----	1	----	----	2
Other Diseases of Urinary System	10	----	----	----	----	1	----	----	----	----	----	----	----	----	----	----	1

ORDER 8. OF GENERATIVE SYSTEM.																	
A. Diseases of the Reproductive Organs.																	
Diseases of the Uterus	9			1													1
Metritis	6																
Disease of Ovaries	17	1															1
Disorders of Menstruation	1																
Menorrhagia	1																
Perineal Abscess	2																
B. Diseases of Parturition.																	
Abortion and Miscarriage	7																
Puerperal Mania	2	1															1
Puerperal Convulsions	16	1															1
Puerperal Hemorrhage	7		1														1
Placenta Previa	2																
Other Accidents of Childbirth	35								1								1
ORDER 9. OF ORGANS OF LOCOMOTION.																	
Caries, Necrosis	9	2														1	3
Arthritis, Periostitis	4																
Other Diseases of Organs of Locomotion	1																
ORDER 10. OF INTEGUMENTARY SYSTEM.																	
Bedsores	1																
Other Diseases of Integumentary System	14																

TABLE VI—CONTINUED. MIDDLESEX COUNTY.

CAUSES OF DEATH.	STATE.	Middletown.	Haddam.	Chatham.	Chester.	Clinton.	Cromwell.	Durham.	East Haddam.	Essex.	Killingworth.	Middlefield.	Old Saybrook.	Portland.	Saybrook.	Westbrook.	TOTAL.
CLASS VII.—Violence.																	
ORDER 1. ACCIDENT AND NEGLIGENCE.																	
Fractures and Contusions	46	3					1						1				5
Fractures and Contusions of Skull	20		1											1			2
Railroad Injuries	134	5					1			1							7
Gun-shot Wound	12																
Burns and Scalds	30											1	1				2
Poisoned	12																
By Arsenic	1																
Drowning	89	2	1							1							4
Suffocation	17					1			2								3
Other Accidents	82																
Falling	47			1													1
ORDER 2. HOMICIDE.																	
Murder	2																
Manslaughter	5																

ORDER 3. SUICIDE.																	
Gun-shot Wounds	13	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	------
Cut, Stab	4	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	------
Poisoned	17	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	------
By Opium	8	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	------
Drowning	20	----	----	1	----	----	----	----	1	----	----	----	1	1	----	----	4
Hanging	16	1	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1
Otherwise	4	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	------
ORDER 4. EXECUTION.																	
Hanging	1	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	------
CLASS VIII.—Unclassified.																	
Tumor	19	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	------
Dropsy	83	2	----	----	----	----	----	----	----	1	----	----	----	----	----	----	3
Debility, Atrophy, Inanition	302	9	1	----	----	----	1	1	1	12	----	1	1	----	----	----	27
Sunstroke	3	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	------
Exhaustion	89	2	----	----	----	----	----	----	1	4	----	----	----	----	----	----	7
Hemorrhage	32	----	----	----	----	----	----	----	----	----	----	----	----	2	1	----	3
Abscess	25	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	1
Sudden Death	15	----	----	2	----	----	----	----	----	----	----	----	----	----	----	----	2
Other ill-defined causes	253	----	----	----	----	----	----	1	1	----	----	----	----	2	1	5	10
Cause not stated	56	2	2	----	----	----	----	----	----	----	----	----	----	2	----	----	6

RECAPITULATION OF MIDDLESEX COUNTY.

CLASSIFIED CAUSES.	State.	Middletown.	Haddam.	Chatham.	Chester.	Clinton.	Cromwell.	Durham.	East Haddam.	Essex.	Killingworth.	Middlefield.	Old Saybrook.	Portland.	Saybrook.	Westbrook.	Total.
All causes	12529	296	39	32	15	21	36	11	52	34	11	16	30	95	16	17	721
CLASSES.																	
I. Zymotic Diseases	2602	30	5	4	3	3	6	1	6	1	----	2	7	25	1	2	96
II. Parasitic	1	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
III. Dietetic	57	2	----	----	----	----	----	----	----	----	----	----	----	----	----	----	2
IV. Constitutional	2220	67	8	4	6	3	9	4	9	4	----	6	1	13	2	2	138
V. Developmental	1000	33	10	----	1	3	5	1	5	----	1	----	2	13	1	2	77
VI. Local	5192	138	11	20	5	11	13	3	26	10	10	6	16	36	10	5	320
VII. Violence	580	11	2	2	----	1	2	----	3	2	----	1	3	2	----	----	29
VIII. Ill Defined and Cause not stated	877	15	3	2	----	----	1	2	3	17	----	1	1	6	2	6	59
Class I. Orders.																	
1. Miasmatic Diseases	1356	12	1	1	1	2	4	1	1	----	----	----	----	10	----	1	34
2. Diarrhœal Diseases	999	13	2	2	2	----	1	----	5	1	----	----	6	14	----	1	47
3. Malarial Diseases	117	2	2	----	1	----	----	----	----	----	----	----	----	1	1	----	7
4. Zoogenous Diseases	1	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
5. Venereal Diseases	7	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
6. Septic	122	3	----	1	----	----	1	----	----	--	----	2	1	----	----	----	8
Class II. Orders.																	
Parasitic Diseases	1	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

Class III. Orders.																	
Dietetic Diseases	57	2	----	----	----	----	----	----	----	----	----	----	----	----	----	----	2
Class IV. Orders.																	
Constitutional Diseases	2220	67	8	4	6	3	9	4	9	4	----	6	1	13	2	2	138
Class V. Orders.																	
Developmental Diseases	1000	33	10	----	1	3	5	1	5	----	1	----	2	13	1	2	77
Class VI. Orders.																	
1. Diseases of Nervous System	1609	57	4	6	5	5	6	----	7	3	4	4	6	6	5	2	120
2. Organs of Special Sense	2	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	------
3. Circulatory System	928	30	1	6	----	3	1	----	6	2	2	1	2	9	3	1	67
4. Respiratory System	1379	22	5	2	----	----	4	1	7	4	1	1	4	9	2	----	62
5. Digestive System	662	15	----	1	----	----	1	1	1	1	2	----	----	8	----	1	31
6. Lymphatic Syst. and Ductless Glands	8	----	----	2	----	----	----	----	----	----	----	----	----	----	----	----	2
7. Urinary System	470	9	----	2	----	3	1	1	4	----	1	----	4	4	----	----	29
8. Generative System	105	3	1	1	----	----	----	----	1	----	----	----	----	----	----	----	6
9. Organs of Locomotion	14	2	----	----	----	----	----	----	----	----	----	----	----	----	----	1	3
10. Integumentary System	15	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	------
Class VII. Orders.																	
1. Accident or Negligence	390	10	2	1	----	1	2	----	2	2	----	1	2	1	----	----	24
2. Homicide	7	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	------
3. Suicide	82	1	----	1	----	----	----	----	1	----	----	----	1	1	----	----	5
4. Execution	1	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	------
Class VIII. Orders.																	
1. Ill Defined	821	13	1	2	----	----	1	2	3	17	----	1	1	4	2	6	53
2. Cause not stated	56	2	2	----	----	----	----	----	----	----	----	----	----	2	----	----	6

TABLE VI.—Continued.

TOLLAND COUNTY.

CAUSES OF DEATH.	State.	Tolland.	Andover.	Bolton.	Columbia.	Coventry.	Ellington.	Hebron.	Mansfield.	Somers.	Stafford.	Union.	Vernon.	Willington.	Total.
CLASS I.—Zymotic Diseases.															
ORDER 1. MIASMATIC.															
Chicken Pox	1														
Measles	62										1				1
Scarlet Fever	81														
Typhus Fever	8														
Relapsing Fever	1														
Influenza	4														
Typhoid Fever	281	1	2			2					4		5	2	16
Cerebro-Spinal Fever	40						1						5		6
Continued Fever	37														
Whooping Cough	92														
Diphtheria	584											9	3	1	13
Membranous Croup	133				1						1		4		6
Other Miasmatic Diseases	32														

ORDER 2. DIARRHŒAL DISEASES.															
Cholera Infantum	506	1		1		2			2	1	1		8		16
Infantile Diarrhœa	257								1				9		10
Cholera Morbus	36										1				1
Dysentery	146					1		1	1			1	1		5
Diarrhœa	54	1		1							1		9		12
ORDER 3. MALARIAL DISEASES.															
Intermittent Fever	21														
Remittent Fever	30											1	1		2
Pernicious or Congestive Fever	17				1										1
Other Malarial Diseases	49														
ORDER 4. ZOOGENOUS DISEASES.															
Hydrophobia	1														
Cow Pox and effects of Vaccination															
ORDER 5. VENEREAL DISEASES.															
Syphilis	4														
Gonorrhœa, Stricture of Uretha	2														
Other Venereal Diseases	1														
ORDER 6. SEPTIC DISEASES.															
Erysipelas	22														
Pyæmia, Septicæmia	51														
Puerperal Fever	49										1				1
CLASS II.—Parasitic Diseases.															
Thrush	1														
Other Parasitic Diseases															
CLASS III.—Dietetic Diseases.															
Intemperance	25							1							1
Chronic Alcoholism	23				1										1
Delirium Tremens	9														

TABLE VI—CONTINUED. TOLLAND COUNTY.

CAUSES OF DEATH.	State.	Tolland.	Andover.	Bolton.	Columbia.	Coventry.	Ellington.	Hebron.	Mansfield.	Somers.	Stafford.	Union.	Vernon.	Willington.	Total.
CLASS IV.—Constitutional Diseases.															
Rheumatism	103										1		1		2
Gout	2														
Rickets	5														
Cancer of Breast	38				1								1		2
Cancer of Stomach	69						1				1			1	3
Cancer of Womb	49					1							2		3
Cancer of other organs	168		1						2	1	1	1	1		7
Tabes Mesenterica	75												3		3
Tubercular Meningitis, Acute Hydroceph.	81				1								1		2
Phthisis	1459	1			1	3	1			4	11	1	27	1	50
Other forms of Tuberculosis	59														
Scrofula	25														
Pott's Disease	3														
Hip-Joint Diseases	2														
Purpura	3														
Anæmia	23														
Diabetes	48									1					1
Other Constitutional Diseases	8														

CLASS V.—Developmental Diseases.															
Premature Birth	217							1		1	3		8		13
Atelectasis	19														
Cyanosis	23										1				1
Spina Bifida	10														
Imperforate Anus	3												1		1
Other Congenital malformations	15												1		1
Umbilical Hemorrhage	9				1										1
Old Age	704	1		2		2	3	1	2	4	2		9	1	27
CLASS VI.—Local Diseases.															
ORDER 1. OF NERVOUS SYSTEM.															
Inflammation of Brain or its Membranes	252				1						1		1		3
Apoplexy	498	1	1	1		1	4	2		2	5		8	1	26
Softening of Brain	56				1	2							2		5
Hydrocephalus, not acute	24								1				1		2
Hemiplegia	32									1					1
Paralysis Agitans	40				1	1				2	3				7
Insanity	47										1		1		2
Chorea	4														
Epilepsy	39		1												1
Convulsions	287										7		3		10
Trismus Nascentium	9														
Tetanus	17														
Paraplegia	10														
Diseases of Spinal Cord	23								1						1
Myelitis	16														
Spinal Meningitis	30														
Locomotor Ataxia	7														
Other Diseases of Nervous System	218				1			2	1		1		4	1	10

TABLE VI—CONTINUED. TOLLAND COUNTY.

CAUSES OF DEATH.	State.	Tolland.	Andover.	Bolton.	Columbia.	Coventry.	Ellington.	Hebron.	Mansfield.	Somers.	Stafford.	Union.	Vernon.	Willington.	Total.
ORDER 2. OF ORGANS OF SPECIAL SENSE.															
Otitis	2														
ORDER 3. OF CIRCULATORY SYSTEM.															
Endocarditis	63												1		1
Valvular Disease of Heart	176														
Disease of Heart	403			1		5				1	6		3		16
Pericarditis	20														
Hypertrophy of Heart	34														
Angina Pectoris	68														
Syncope	9												1		1
Aneurism	5														
Senile Gangrene	28	1			1									1	3
Thrombosis, Embolism	41	3											1		4
Phlebitis	5														
Other Diseases of Circulatory System	77								4						4

Order 4. Of Respiratory System.															
Laryngitis	23														
Catarrhal Croup	6														
Other Diseases of Larynx or Trachea	3														
Emphysema, Asthma	32									1					1
Bronchitis	324							1			1			1	3
Pneumonia	915	3	2						1	4	2	1	6	2	21
Pleurisy	38		1										1		2
Other Diseases of Respiratory System	38					1							2		3
Order 5. Of Digestive System.															
Stomatitis	3														
Dentition	45				1										1
Quinsy	5									1					1
Dyspepsia	13													1	1
Hæmatemesis	12														
Disease of Stomach	86												1		1
Ulcer of Stomach	22			1											1
Enteritis	112							1	1	1			1		4
Ulceration of Intestines	9														
Obstruction of Intestines	25									1			1		2
Strangulation of Intestines	1														
Intussusception of Intestines	7														
Hernia	23														
Fistula	1														
Peritonitis (not puerperal)	122						1						4		5
Ascites	7														
Gallstones	2														
Cirrhosis of Liver	63						1						1		2
Other Diseases of Liver	40								1				1		2
Hepatitis	29					1			2						3
Jaundice	15					1		1							2
Other Diseases of Disgestive System	20					1								1	2

TABLE VI—CONTINUED. TOLLAND COUNTY.

CAUSES OF DEATH.	State.	Tolland.	Andover.	Bolton.	Columbia.	Coventry.	Ellington.	Hebron.	Mansfield.	Somers.	Stafford.	Union.	Vernon.	Willington.	Total.
ORDER 6. OF LYMPHATIC SYSTEM AND DUCTLESS GLANDS.															
Addison's Disease	2							1							1
Diseases of Lymphatic System	6														
ORDER 7. OF URINARY SYSTEM.															
Nephritis	79							1							1
Bright's Disease	281					1			1		1		1		4
Uræmia	34											1	1		2
Suppression of Urine	3														
Calculus	3														
Hæmaturia	6														
Disease of Bladder	40												1		1
Prostatitis	14														
Other Diseases of Urinary System	10														

ORDER 8. OF GENERATIVE SYSTEM.															
A. Diseases of the Reproductive Organs.															
Diseases of the Uterus	9														
Metritis	6														
Disease of Ovaries	17														
Disorders of Menstruation	1														
Menorrhagia	1														
Perineal Abscess	2														
B. Diseases of Parturition.															
Abortion and Miscarriage	7														
Puerperal Mania	2														
Puerperal Convulsions	16														
Puerperal Hemorrhage	7														
Placenta Previa	2														
Other Accidents of Childbirth	35														
ORDER 9. OF ORGANS OF LOCOMOTION.															
Caries, Necrosis	9														
Arthritis, Periostitis	4														
Other Diseases of Organs of Locomotion	1														
ORDER 10. OF INTEGUMENTARY SYSTEM.															
Bedsores	1														
Other Diseases of Integumentary System	14														

TABLE VI—CONTINUED. TOLLAND COUNTY.

CAUSES OF DEATH.	State.	Tolland.	Andover.	Bolton.	Columbia.	Coventry.	Ellington.	Hebron.	Mansfield.	Somers.	Stafford.	Union.	Vernon.	Willington.	Total.
CLASS VII.—Violence.															
ORDER 1. ACCIDENT AND NEGLIGENCE.															
Fractures and Contusions	46												1		1
Fractures and Contusions of Skull	20										1		2		3
Railroad Injuries	134														
Gun-shot Wound	12									1					1
Burns and Scalds	30														
Poisoned	12														
By Arsenic	1														
Drowning	89	1	1									1	2		5
Suffocation	17														
Other Accidents	82						1								1
Falling	47						1	1							2
ORDER 2. HOMICIDE.															
Murder	2														
Manslaughter	5														

ORDER 3. SUICIDE.															
Gun-shot Wounds	13					1							2		3
Cut, Stab	4														
Poisoned	17						1				1				2
By Opium	8														
Drowning	20														
Hanging	16														
Otherwise	4														
ORDER 4. EXECUTION.															
Hanging	1														
CLASS VIII.—Unclassified.															
Tumor	19								1						1
Dropsy	83	1			1					1	3	1	2		9
Debility, Atrophy, Inanition	302							1			2				3
Sunstroke	3														
Exhaustion	89					1							1		2
Hemorrhage	32														
Abscess	25												1		1
Sudden Death	15														
Other ill-defined causes	253				1		1						3		5
Cause not stated	56						1						1	1	3

RECAPITULATION OF TOLLAND COUNTY.

CLASSIFIED DISEASES.	State.	Tolland.	Andover.	Bolton.	Columbia.	Coventry.	Ellington.	Hebron.	Mansfield.	Somers.	Stafford.	Union.	Vernon.	Willington.	Total.
All causes	12529	15	9	7	15	27	17	15	22	28	55	17	162	15	414
CLASSES.															
I. Zymotic Diseases	2602	3	2	2	2	5	1	1	4	1	10	11	45	3	90
II. Parasitic	1														
III. Dietitic	57				1			1							2
IV. Constitutional	2220	1	1		3	4	2		2	6	14	2	36	2	73
V. Developmental	1000	1		2	1	2	3	2	2	5	6		19	1	44
VI. Local	5192	8	5	3	6	14	6	9	13	14	28	2	47	8	163
VII. Violence	580	1	1			1	3	1		1	2	1	7		18
VIII. Ill Defined and Causes not stated	877	1			2	1	2	1	1	1	5	1	8	1	24
Class I. Orders.															
1. Miasmatic Diseases	1356	1	2		1	2	1				6	9	17	3	42
2. Diarrhœal Diseases	999	2		2		3		1	4	1	3	1	27		44
3. Malarial Diseases	117				1							1	1		3
4. Zoogenous Diseases	1														
5. Venereal Diseases	7														
6. Septic Diseases	122										1				1
Class II. Orders.															
Parasitic Diseases	1														

Class III. Orders.															
Dietetic Diseases	57				1			1							2
Class IV. Orders.															
Constitutional Diseases	2220	1	1		3	4	2		2	6	14	2	36	2	73
Class V. Orders.															
Developmental Diseases	1000	1		2	1	2	3	2	2	5	6		19	1	44
Class VI. Orders.															
1. Diseases of Nervous System	1609	1	2	1	4	4	4	4	3	5	18		20	2	68
2. Organs of Special Sense	2														
3. Circulatory System	928	4		1	1	5			4	1	6		6	1	29
4. Respiratory System	1379	3	3			1		1	1	5	3	1	9	3	30
5. Digestive System	662			1	1	3	2	2	4	3			9	2	27
6. Lymphatic Syst. and Ductless Glands	8							1							1
7. Urinary System	470					1		1	1		1	1	3		8
8. Generative System	105														
9. Organs of Locomotion	14														
10. Integumentary System	15														
Class VII. Orders.															
1. Accident or Negligence	390	1	1				2	1		1	1	1	5		13
2. Homicide	7														
3. Suicide	82					1	1				1		2		5
4. Execution	1														
Class VIII. Orders.															
1. Ill Defined	821	1			2	1	1	1	1	1	5	1	7		21
2. Cause not stated	56						1						1	1	3

RECAPITULATION OF TABLE VI.

CLASSIFIED DISEASES.	State.	Hartford Co.	New Haven Co.	New London Co.	Fairfield Co.	Windham Co.	Litchfield Co.	Middlesex Co.	Tolland Co.	Per cent. to Total Mortality.	Total, 1888.
All causes	12529	2557	3383	1255	2583	842	774	721	414	10.0	12980
CLASSES.											
I. Zymotic Diseases	2602	592	768	197	566	180	113	96	90	21.5	2781
II. Parasitic Diseases	1	------	1	------	------	------	------	------	------	.007	12
III. Dietetic	57	15	16	5	10	------	7	2	2	.45	45
IV. Constitutional	2220	404	627	251	444	136	147	138	73	17.7	2302
V. Developmental	1000	209	256	101	178	71	64	77	44	7.8	942
VI. Local	5192	1034	1348	541	1083	348	355	320	163	41.4	5524
VII. Violence	580	128	151	43	138	35	38	29	18	4.7	556
VIII. Ill Defined and Cause not stated	877	175	216	117	164	72	50	59	24	7.0	818
Class I. Orders.											
1. Miasmatic Diseases	1356	342	396	101	307	90	44	34	42	10.8	1249
2. Diarrhœal Diseases	999	213	290	69	198	81	57	47	44	7.9	1237
3. Malarial Diseases	117	16	35	7	43	1	5	7	3	.93	134
4. Zoogenous Diseases	1	------	------	1	------	------	------	------	------	.007	------
5. Venereal Diseases	7	2	3	1	1	------	------	------	------	.05	12
6. Septic	122	19	44	18	17	8	7	8	1	.97	149
Class II. Orders.											
Parasitic Diseases	1	------	1	------	------	------	------	------	------	.007	12

Class III. Orders.											
Dietetic Diseases	57	15	16	5	10	------	7	2	2	.45	45
Class IV. Orders.											
Constitutional Diseases	2220	404	627	251	444	136	147	138	73	17.7	2302
Class V. Orders.											
Developmental Diseases	1000	209	256	101	178	71	64	77	44	7.8	942
Class VI. Orders.											
1. Diseases of Nervous System	1609	322	408	150	334	98	109	120	68	12.7	1666
2. Organs of Special Sense	2	------	1	------	1	------	------	------	------	.01	4
3. Circulatory System	928	190	216	114	191	65	56	67	29	7.4	981
4. Respiratory System	1379	298	401	139	279	107	83	62	30	11.0	1620
5. Digestive System	662	116	160	77	166	40	45	31	27	5.2	652
6. Lymphatic System and Ductless Glands	8	1	2	------	1	------	1	2	1	.06	5
7. Urinary System	470	105	122	53	87	21	45	29	8	3 7	468
8. Generative System	105	18	32	4	18	15	12	6	------	.83	103
9. Organs of Locomotion	14	2	2	2	1	1	3	3	------	.11	11
10. Integumentary System	15	2	4	2	5	1	1	------	------	.11	14
Class VII. Orders.											
1. Accident or Negligence	390	113	126	35	116	34	29	24	13	3.1	444
2. Homicide	7	------	1	1	5	------	------	------	------	.05	10
3. Suicide	82	14	21	7	17	1	9	5	5	.65	101
4. Execution	1	1	------	------	------	------	------	------	------	.007	1
Class VIII. Orders.											
1. Ill Defined	821	159	207	115	161	62	43	53	21	6.5	733
2. Cause not stated	56	16	9	2	3	10	7	6	3	.44	85

TABLE VII.

NOSOLOGICAL ARRANGEMENT BY COUNTIES, WITH COMPARATIVE MORTALITY FOR TEN YEARS.

NOTE.—Some of the blank spaces in the following table are due to different methods of tabulating diseases in the previous reports: for example, some reports call all cases of Diarrhœa in children Cholera Infantum, others call them Infantile Diarrhœa. Again, in some reports Cholera Morbus is included with Diarrhœa, in others they are separately counted.

CAUSES.	Hartford Co.	New Haven Co	New London Co.	Fairfield Co.	Windham Co.	Litchfield Co.	Middlesex Co.	Tolland Co.	1889, Total.	Per cent to Total Mortality.	1888, Total.	1887, Total.	1886. Total.	1885, Total.	1884, Total.	1883, Total.	1882, Total.	1881, Total.	1880, Total.	Aggregate for Ten Years.	Average for Ten Years.
CLASS I.—Zymotic Diseases.																					
ORDER 1. MIASMATIC.																					
Small Pox	---	---	---	---	---	---	---	---	---	---	4	4	---	---	---	8	9	31	9	65	6.5
Chicken Pox	---	1	---	---	---	---	---	---	1	---	1	2	---	---	---	---	---	---	---	4	.4
Measles	21	11	6	13	8	1	1	1	62	.48	41	95	9	154	45	104	48	14	59	631	63.1
Scarlet Fever	10	13	3	51	1	1	2	---	81	.64	140	117	117	286	208	303	352	121	92	1817	181.7
Typhus Fever	---	---	4	1	3	---	---	---	8	.06	8	5	---	7	---	---	---	---	---	28	2.8
Relapsing Fever	---	---	---	1	---	---	---	---	1	---	1	1	---	---	---	---	---	---	---	3	.3
Influenza	1	---	2	---	---	1	---	---	4	.03	9	4	3	8	---	---	---	---	---	28	2.8
Typhoid Fever	62	62	26	68	20	21	6	16	281	2.24	292	195	244	227	281	291	324	257	242	2634	263.4
Cerebro-Spinal Fever	9	20	3	6	4	2	---	6	40	.31	48	28	11	22	88	74	75	75	65	526	52.6
Continued Fever	18	11	---	6	---	1	1	---	37	.29	44	36	57	68	95	146	169	222	153	927	92.7
Whooping Cough	16	42	5	19	8	1	1	---	92	.73	76	70	106	64	76	91	65	59	104	803	80.3
Diphtheria	165	196	39	110	35	15	11	13	584	4.68	370	317	359	348	345	481	264	333	332	3733	373.3
Membranous Croup	25	46	11	24	9	1	11	6	133	1.06	186	171	203	151	164	155	181	178	181	1703	170.3
Mumps	---	---	---	---	---	---	---	---	---	---	4	---	---	---	---	---	---	---	---	4	.4
Other Miasmatic Diseases	15	4	2	8	2	---	1	---	32	.24	25	19	---	---	---	1	---	---	---	77	7.7

ORDER 2. DIARRHŒAL.																					
Cholera Infantum	67	153	41	128	46	34	21	16	506	4.03	753	727	----	----	----	----	696	526	570	3778	377.8
Infantile Diarrhœa	72	88	14	37	23	5	8	10	257	2.04	200	173	590	494	683	609	----	----	----	3006	300.6
Cholera Morbus	17	5	2	7	1	2	1	1	36	.28	36	28	28	30	----	----	----	----	----	158	15.8
Dysentery	51	29	10	17	8	12	14	5	146	1.16	168	286	176	121	114	101	155	191	69	1527	152.7
Diarrhœa	6	15	2	9	3	4	3	12	54	.43	80	86	65	56	94	110	94	109	108	776	77.6
ORDER 3. MALARIAL.																					
Intermittent Fever	2	16	2	---	---	---	1	---	21	.16	32	23	9	15	22	38	12	37	32	241	24.1
Remittent Fever	5	3	1	15	---	3	1	2	30	.23	29	24	23	28	15	23	14	25	7	218	21.8
Pernicious or Congestive Fever	6	2	---	5	---	---	3	1	17	.13	17	18	13	8	28	30	46	30	33	240	24.0
Other Malarial Diseases	3	14	4	23	1	2	2	---	49	.39	56	57	----	78	14	20	33	43	40	390	39.9
ORDER 4. ZOOGENOUS.																					
Hydrophobia	---	---	1	---	---	---	---	---	1	----	----	1	----	----	1	----	----	1	1	5	.5
Glanders	---	---	---	---	---	---	---	---	----	----	----	----	----	----	1	----	----	----	----	1	.1
Cow Pox and effects of Vaccination	---	---	---	---	---	---	---	---	----	----	----	----	----	1	----	----	----	----	----	1	.1
Other Zoogenous Diseases	---	---	---	---	---	---	---	---	----	----	----	1	1	1	----	----	----	----	1	4	.4
ORDER 5. VENEREAL.																					
Syphilis	2	2	---	---	---	---	---	---	4	.03	12	10	14	12	15	10	11	16	10	114	11.4
Gonorrhœa, Stricture of Uretha	---	1	---	1	---	---	---	---	2	.01	----	----	1	2	----	6	1	----	----	12	1.2
Other Venereal Diseases	---	---	1	---	---	---	---	---	1	----	----	----	----	----	----	----	----	----	----	1	1.1
ORDER 6. SEPTIC.																					
Phagedena	---	---	---	---	---	---	---	---	----	----	----	----	3	3	1	----	----	----	----	7	.7
Erysipelas	2	12	1	2	3	---	2	---	22	.17	45	45	73	60	37	62	49	62	55	510	51.0
Pyæmia, Septicæmia	10	16	12	5	2	4	2	---	51	.40	60	47	43	34	39	23	30	12	18	357	35.7
Puerperal Fever	7	16	5	10	3	3	4	1	49	.39	46	61	40	44	46	58	52	46	53	495	49.5
CLASS II.—Parasitic Diseases.																					
Thrush	---	1	---	---	---	---	---	---	1	----	6	1	----	1	3	2	1	3	5	23	2.3
Hydatids	---	---	---	---	---	---	---	---	----	----	1	----	1	1	1	----	3	1	1	9	.9
Worms	---	---	---	---	---	---	---	---	----	----	4	----	----	----	----	----	----	----	----	4	.4
Other Parasitic Diseases	---	---	---	---	---	---	---	---	----	----	1	----	----	----	----	----	----	----	----	1	.1

TABLE VII—CONTINUED.

CAUSES.	Hartford Co.	New Haven Co.	New London Co.	Fairfield Co.	Windham Co.	Litchfield Co.	Middlesex Co.	Tolland Co.	1889, Total.	Per cent. to Total Mortality.	1888, Total.	1887, Total.	1886, Total.	1885, Total.	1884, Total.	1883, Total.	1882, Total.	1881, Total.	1880, Total.	Aggregate for Ten Years.	Average for Ten Years.
CLASS III.—Dietetic Diseases.																					
Starvation	---	---	---	---	---	---	---	---	---	---	3	---	2	4	---	1	5	10	6	31	3.1
Intemperance	11	5	2	4	---	2	---	1	25	.19	18	10	42	34	33	---	---	---	37	199	19.9
Chronic Alcoholism	2	8	1	6	---	4	1	1	23	.18	16	31	---	---	---	39	47	49	---	205	20.5
Delirium Tremens	2	3	2	---	---	1	1	---	9	.07	8	6	17	9	8	---	---	---	---	57	5.7
Other Dietetic Diseases	---	---	---	---	---	---	---	---	---	---	---	1	---	---	---	---	--	---	---	1	.1
CLASS IV.—Constitutional Dis.																					
Rheumatism	11	45	10	22	3	8	2	2	103	.82	99	76	99	71	76	81	73	90	60	828	82.8
Gout	---	---	---	1	---	---	1	---	2	.01	1	1	---	3	6	1	1	1	2	18	1.8
Rickets	2	2	---	---	1	---	---	---	5	.03	5	1	3	1	1	---	---	---	---	16	1.6
Cancer of Breast	4	7	2	9	3	8	3	2	38	.31	34	38	---	---	---	---	---	---	---	110	11.0
Cancer of Stomach	12	19	10	10	4	6	5	3	69	.55	77	54	---	---	---	---	---	---	---	200	20.0
Cancer of Womb	9	10	3	9	4	6	5	3	49	.39	49	43	---	---	---	---	---	---	---	141	14.1
Cancer of other organs	30	33	25	31	13	15	14	7	168	1.34	188	181	280	288	312	305	248	269	226	2465	246.5
Tabes Mesenterica	9	24	13	12	---	1	13	3	75	.59	102	68	117	91	70	73	102	145	107	950	95.0
Tubercular Mening., Acute Hydro.	18	20	15	18	3	2	3	2	81	.64	75	88	89	56	38	53	52	---	---	532	53.2
Phthisis	285	423	152	291	83	92	83	50	1459	11.63	1491	1428	1364	1422	1452	1517	1455	1404	1327	14319	1431.9
Other forms of Tuberculosis	6	19	9	10	10	3	2	---	59	.49	53	72	4	9	1	---	---	---	---	198	19.8
Scrofula	7	8	5	2	2	---	1	---	25	.19	36	25	35	37	31	42	49	44	27	341	34.1
Pott's Disease	2	---	---	1	---	---	---	---	3	.02	3	3	1	4	---	---	---	---	---	14	1.4
Hip-Joint Disease	1	---	---	---	---	---	1	---	2	.01	4	2	9	8	---	---	---	---	---	25	2.5
Purpura	1	1	---	---	1	---	---	---	3	.02	4	6	5	2	4	4	2	2	3	35	3.5
Anæmia	2	9	1	3	5	1	2	---	23	.18	28	26	28	35	15	3	2	7	1	168	16.8
Diabetes	5	7	6	17	4	5	3	1	48	.38	49	50	42	45	41	39	42	21	27	404	40.4
Other Constitutional Diseases	---	---	---	8	---	---	---	---	8	.06	4	---	---	---	---	---	---	---	---	12	1.2

CLASS V.—Developmental Dis.																					
Premature Birth	38	83	13	34	16	12	8	13	217	1.73	190	274	156	163	207	437	356	297	245	2542	254.2
Atelectasis	3	11	---	3	1	1	---	---	19	.15	12	48	18	16	16	---	---	---	---	129	12.9
Cyanosis	7	5	2	3	1	3	1	1	23	.18	26	10	21	24	10	37	42	34	30	257	26.9
Spina Bifida	2	3	2	2	1	---	---	---	10	.07	8	8	10	7	6	6	6	10	6	77	7.7
Imperforate Anus	---	2	---	---	---	---	---	1	3	.02	1	---	---	---	---	---	---	---	---	4	.4
Other Congenital malformations	1	6	2	3	---	---	2	1	15	.11	11	19	15	23	9	32	13	20	18	175	17.5
Umbilical Hemorrhage	---	7	---	---	---	1	---	1	9	-07	6	8	11	4	7	3	---	---	---	48	4.8
Old Age	158	139	82	133	52	47	66	27	704	5.61	688	623	783	667	660	623	236	626	531	6541	654.1
CLASS VI.—Local Diseases.																					
ORDER 1. OF NERVOUS SYSTEM.																					
Inflam. of Brain or its Membranes	58	81	20	44	25	9	12	3	252	2.01	291	274	292	360	325	377	411	383	375	3340	334.0
Apoplexy	104	111	43	101	29	47	37	26	498	3.97	468	478	341	311	309	274	297	308	283	3567	356.7
Softening of Brain	8	13	4	14	5	6	1	5	56	.44	69	54	73	60	---	---	---	---	---	312	31.2
Hydrocephalus, not acute	4	7	5	2	2	---	2	2	24	.19	37	47	1	62	71	56	61	60	54	483	48.3
Hemiplegia	3	5	2	10	---	1	10	1	32	.25	25	28	---	209	202	175	189	190	164	1214	121.4
Paralysis Agitans	3	4	1	7	6	7	5	7	40	.31	65	85	---	---	---	---	---	---	---	190	19.0
Insanity	15	10	5	---	1	---	14	2	47	.37	73	52	37	59	40	71	55	58	53	545	54.5
Chorea	---	2	---	1	---	---	1	---	4	.03	---	3	4	1	---	2	1	3	1	19	1.9
Epilepsy	9	8	4	7	3	3	4	1	39	.31	34	43	36	25	42	43	39	38	27	366	36.6
Convulsions	62	87	33	68	6	11	10	10	287	.22	267	251	279	300	285	284	263	258	259	2730	273.0
Trismus Nascentium	1	4	1	2	---	---	1	---	9	.07	13	6	5	14	6	---	---	---	---	53	5.3
Tetanus	2	8	1	3	---	---	3	---	17	.13	27	22	18	18	13	25	23	18	23	204	20.4
Paraplegia	1	4	---	3	1	---	1	---	10	.07	7	6	---	---	---	---	---	---	---	23	2.3
Diseases of Spinal Cord	4	1	1	12	1	---	3	1	23	.10	17	11	12	19	13	30	52	23	26	226	22.6
Myelitis	3	7	1	3	1	1	---	---	16	.12	12	4	6	2	---	---	---	---	---	40	4.0
Spinal Meningitis	5	4	5	8	4	3	1	---	30	.23	36	32	41	38	23	---	---	---	---	200	20.0
Locomotor Ataxia	3	---	---	3	---	1	---	---	7	.05	4	4	4	8	1	---	---	---	---	28	2.8
Other Diseases of Nervous System	37	52	24	46	14	20	15	10	218	1.73	221	199	285	305	234	300	302	257	333	2654	265.4

TABLE VII—CONTINUED.

CAUSES.	Hartford Co.	New Haven Co.	New London Co.	Fairfield Co.	Windham Co.	Litchfield Co.	Middlesex Co.	Tolland Co.	1889, Total.	Per Cent. to Total Mortality.	1888, Total.	1887, Total.	1886, Total.	1885, Total.	1884, Total.	1883, Total.	1882, Total.	1881, Total.	1880, Total.	Aggregate for Ten Years.	Average for Ten Years.
ORDER 2. OF ORGANS OF SPECIAL SENSE.																					
Epistaxis	---	---	---	---	---	---	---	---	---	---	---	1	1	2	1	---	1	1	---	7	.7
Otitis	---	1	---	1	---	---	---	---	2	.01	3	2	---	---	---	---	---	---	---	7	.7
Other Diseases of Eye, Ear or Nose	---	---	---	---	---	---	---	---	---	---	1	---	---	---	---	---	---	---	---	1	.1
ORDER 3. OF CIRCULATORY SYSTEM.																					
Endocarditis	26	14	1	17	1	2	1	1	63	.51	53	29	---	---	---	---	---	---	---	145	14.5
Valvular Disease of Heart	24	48	12	41	19	14	18	---	176	1.40	168	136	---	---	---	---	---	---	---	480	48.0
Disease of Heart	107	89	38	83	33	11	26	16	403	3.21	463	477	640	635	557	591	545	492	499	5302	530.2
Pericarditis	2	5	1	8	---	2	2	---	20	.15	25	26	13	24	21	2	21	25	27	204	20.4
Hypertrophy of Heart	5	12	2	5	2	4	4	---	34	.27	48	34	---	---	---	---	---	---	---	116	11.6
Angina Pectoris	2	19	28	6	2	5	6	---	68	.54	70	37	36	20	21	---	26	---	5	283	28.3
Syncope	---	1	3	2	---	1	1	1	9	.07	16	6	---	1	---	---	---	---	---	32	3.2
Aneurism	1	4	---	---	---	---	---	---	5	.03	8	11	13	4	8	5	6	8	11	79	7.9
Senile Gangrene	6	6	6	6	---	1	---	3	28	.22	17	15	27	30	27	31	37	44	29	285	28.5
Thrombosis, Embolism	6	4	16	7	---	1	3	4	41	.32	44	39	14	11	10	5	8	12	5	189	18.9
Phlebitis	---	1	2	---	---	---	1	---	4	.03	1	1	1	2	1	---	2	1	2	15	1.5
Other Diseases of Circulatory System	11	13	5	16	8	15	5	4	77	.61	68	64	---	1	---	---	---	---	---	210	21.0

Order 4. Of Respiratory System.																					
Laryngitis	1	8	4	8	---	2	---	---	23	.10	23	24	17	15	11	16	12	20	14	175	17.5
Catarrhal Croup	4	---	---	---	2	---	---	---	6	.04	3	2	---	---	---	---	---	---	---	11	1.1
Other Diseases of Larynx or Trachea	---	1	---	1	---	1	---	---	3	.02	3	2	---	---	---	---	---	---	---	8	.8
Emphysema Asthma	4	8	8	3	7	1	---	1	32	.25	44	37	24	24	31	16	28	31	38	305	30.5
Bronchitis	72	114	19	72	15	13	16	3	324	2.58	365	229	197	245	204	207	197	168	173	2309	230.9
Pneumonia	187	255	99	173	76	60	44	21	915	7.30	1107	963	837	1025	694	891	804	713	712	8661	866.1
Pleurisy	4	9	2	11	3	5	2	2	38	.31	27	28	16	24	17	23	23	16	22	244	24.4
Other Dis. of Respiratory System	6	6	7	11	4	1	---	3	38	.31	48	42	34	33	48	49	93	82	100	567	56.7
Order 5. Of Digestive System.																					
Stomatitis	---	---	---	2	---	1	---	---	3	.02	10	6	---	---	1	---	---	---	---	20	2.0
Dentition	4	14	3	15	4	1	3	1	45	.35	29	28	35	26	37	46	29	37	38	350	35.0
Quinsy	1	1	1	1	---	---	---	1	5	.03	7	4	2	3	---	1	---	8	3	33	3.3
Dyspepsia	2	4	4	1	---	1	---	1	13	.10	20	17	5	11	13	---	---	---	---	79	7.9
Hæmatemesis	2	2	1	4	1	---	2	---	12	.09	8	8	24	27	---	---	---	---	---	79	7.9
Disease of Stomach	14	23	8	20	9	5	6	1	86	.68	100	84	101	98	109	149	115	95	110	1047	104.7
Ulcer of Stomach	5	3	3	9	---	1	---	1	22	.17	12	17	11	8	14	---	---	---	---	84	8.4
Enteritis	19	17	28	27	3	7	7	4	112	.89	91	98	91	96	97	72	56	37	63	813	81.3
Ulceration of Intestines	2	1	1	2	1	1	1	---	9	.07	16	18	9	7	23	12	14	15	12	135	13.5
Obstruction of Intestines	4	7	3	6	---	3	---	2	25	.19	25	22	20	15	12	---	---	---	---	119	11.9
Strangulation of Intestines	---	1	---	---	---	---	---	---	1	---	1	1	---	---	---	---	---	---	---	3	.3
Intussusception of Intestines	1	4	1	---	---	1	---	---	7	.05	10	5	---	4	11	26	21	14	4	102	10.2
Hernia	6	7	1	3	3	2	1	---	23	.18	29	23	18	20	22	22	20	13	11	201	20.1
Fistula	1	---	---	---	---	---	---	---	1	---	2	---	5	---	---	4	1	3	2	18	1.8
Peritonitis (not puerperal)	22	28	8	40	7	5	7	5	122	.97	115	104	127	121	78	121	119	161	113	1181	118.1
Ascites	---	2	4	---	---	1	---	---	7	.05	5	12	8	5	6	8	11	5	8	75	7.5
Gallstones	1	---	---	1	---	---	---	---	2	.01	5	5	10	2	---	---	---	---	---	24	2.4
Cirrhosis of Liver	13	23	3	13	2	7	---	2	63	.50	45	44	40	27	43	---	---	---	---	262	26.2
Other Diseases of Liver	5	10	3	10	6	2	2	2	40	.31	50	63	66	62	55	85	85	98	78	682	68.2
Hepatitis	12	6	1	4	---	2	1	3	29	.23	24	38	30	20	25	24	13	17	25	245	24.5
Jaundice	---	5	3	1	1	3	---	2	15	.11	16	13	17	19	27	13	20	21	14	175	17.5
Other Diseases of Digestive System	2	2	1	7	3	2	1	2	20	.15	32	24	20	20	23	14	23	11	13	200	20.0

TABLE VII—CONTINUED.

CAUSES.	Hartford Co.	New Haven Co.	New London Co.	Fairfield Co.	Windham Co.	Litchfield Co.	Middlesex Co.	Tolland Co.	1889, Total.	Per Cent. to Total Mortality.	1888, Total.	1887, Total.	1886, Total.	1885, Total.	1884, Total.	1883, Total.	1882, Total.	1881, Total.	1880, Total.	Aggregate for Ten Years.	Average for Ten Years.
ORDER 6. OF LYMPHATIC SYSTEM AND DUCTLESS GLANDS.																					
Addison's Disease	1	1	---	1	---	1	1	1	6	.04	---	2	1	1	---	1	1	1	2	15	1.5
Disease of Spleen	---	---	---	---	---	---	---	---	---	---	1	1	4	2	---	1	2	2	2	15	1.5
Bronchocele	---	---	---	---	---	---	---	---	---	---	2	---	2	---	1	---	---	---	1	6	.6
Diseases of Lymphatic System	---	1	---	---	---	---	1	---	2	.01	2	3	---	---	---	---	---	---	---	7	.7
ORDER 7. OF URINARY SYSTEM.																					
Nephritis	12	33	8	17	2	5	1	1	79	.63	90	76	50	61	37	30	32	19	21	495	49.5
Bright's Disease	72	64	31	47	15	28	20	4	281	2.25	269	248	223	191	206	193	141	149	138	2039	203.9
Uræmia	8	6	4	11	---	2	1	2	34	.27	34	25	25	31	27	29	26	17	14	262	26.2
Suppression of Urine	---	---	---	2	---	---	1	---	3	.02	5	2	---	---	---	---	---	---	---	10	1.0
Calculus	---	1	1	---	---	1	---	---	3	.02	2	2	7	2	8	5	7	6	6	48	4.8
Hæmaturia	3	2	---	1	---	---	---	---	6	.04	2	2	4	1	---	---	---	---	---	15	1.5
Disease of Bladder	8	8	4	8	3	5	3	1	40	.31	38	42	26	42	43	39	29	23	22	344	34.4
Prostatitis	---	3	4	1	---	4	2	---	14	.11	8	11	8	1	3	---	---	---	---	45	4.5
Other Diseases of Urinary System	2	5	1	---	1	---	1	---	10	.07	20	23	37	42	30	19	33	32	39	285	28.5

ORDER 8. OF GENERATIVE SYSTEM.																					
A. *Of Reproductive Organs.*																					
Diseases of the Uterus	2	2	---	2	1	1	1	---	9	.07	9	11	24	10	16	5	28	10	27	149	14.9
Metritis	---	5	1	---	---	---	---	---	6	.04	3	2	4	4	1	---	---	---	---	20	2.0
Disease of Ovaries	4	3	1	3	3	2	1	---	17	.13	15	9	13	12	15	17	23	16	23	160	16.0
Disorders of Menstruation	---	---	---	---	---	1	---	---	1	---	1	---	---	1	---	---	---	---	---	3	.3
Menorrhagia	---	1	---	---	---	---	---	---	1	---	---	1	---	1	---	---	---	---	---	3	.3
Pelvic Abscess	---	---	---	---	---	---	---	---	---	---	8	1	---	---	---	---	---	---	---	9	.9
Perineal Abscess	2	---	---	---	---	---	---	---	2	.01	---	---	---	---	---	---	---	---	---	2	.2
Dis. of Testis, Penis, Scrotum, etc.	---	---	---	---	---	---	---	---	---	---	---	---	2	---	---	---	---	---	---	2	.2
B. *Of Parturition.*																					
Abortion and Miscarriage	4	2	---	1	---	---	---	---	7	.05	5	15	9	8	---	6	---	---	---	50	5.0
Puerperal Mania	---	---	---	---	---	1	1	---	2	.01	2	5	2	3	4	---	---	---	---	18	1.8
Puerperal Convulsions	3	6	---	3	3	---	1	---	16	.12	9	15	17	23	17	---	---	---	---	97	9.7
Puerperal Hemorrhage	---	---	1	2	2	1	1	---	7	.05	6	1	18	12	8	---	---	---	---	52	5.2
Placenta Previa	---	2	---	---	---	---	---	---	2	.01	3	1	4	2	---	---	---	---	---	12	1.2
Phlegmasia Dolens	---	---	---	---	---	---	---	---	---	---	3	---	---	---	---	---	---	---	---	3	.3
Other Accidents of Childbirth	3	11	1	7	6	6	1	---	35	.27	39	55	35	37	32	29	71	71	37	441	44.1
ORDER 9. OF ORG. OF LOCOMOTION.																					
Caries, Necrosis	---	2	1	---	---	3	3	---	9	.07	4	3	3	---	4	5	16	1	---	45	4.5
Arthritis, Periostitis	1	---	1	1	1	---	---	---	4	.03	4	6	---	---	1	---	---	4	1	20	2.0
Other Dis. of Organs of Locomotion	1	---	---	---	---	---	---	---	1	---	3	1	---	5	5	13	1	9	2	40	4.0
ORDER 10. OF INTEGUMENTARY SYSTEM.																					
Bedsores	---	---	---	---	---	1	---	---	1	---	---	---	---	---	---	---	---	---	---	1	.1
Carbuncles	---	---	---	---	---	---	---	---	---	---	---	---	4	8	---	2	8	5	1	28	2.8
Other Dis. of Integumentary System	2	4	2	5	1	---	---	---	14	.11	14	9	13	13	2	5	19	10	20	119	11.9

TABLE VII—CONTINUED.

CAUSES.	Hartford Co.	New Haven Co.	New London Co.	Fairfield Co.	Windham Co.	Litchfield Co.	Middlesex Co.	Tolland Co.	1889, Total.	Per Cent. to Total Mortality.	1888, Total.	1887, Total.	1886, Total.	1885, Total.	1884, Total.	1883, Total.	1882, Total.	1881, Total.	1880, Total.	Aggregate for Ten Years.	Average for Ten Years.
CLASS VII.—Violence.																					
ORDER 1. ACCIDENT OR NEGLIGENCE.																					
Fractures and Contusions	20	10	---	6	2	2	5	1	46	.36	51	60	38	63	61	77	105	62	102	665	66.5
Fractures and Contusions of Skull	1	4	3	4	---	3	2	3	20	.15	30	13	---	---	---	---	---	---	---	63	6.3
Railroad Injuries	18	45	7	44	8	5	7	---	134	1.06	104	99	97	104	68	121	82	39	16	864	86.4
Gun-shot Wound	4	3	---	3	---	1	---	1	12	.09	13	9	2	4	--	---	---	---	---	40	4.0
Burns and Scalds	3	10	1	10	3	1	2	---	30	.23	34	32	44	50	35	35	38	43	52	393	39.3
Poisoned	---	3	---	4	2	3	---	---	12	.09	14	14	17	19	24	18	13	21	11	163	16.3
Arsenic	---	1	---	---	---	---	---	---	1	---	2	---	---	---	---	---	---	---	---	3	.3
Drowning	16	19	11	21	7	6	4	5	89	.71	87	84	78	85	61	79	74	51	74	762	76.2
Suffocation	1	4	---	6	2	1	3	---	17	.13	12	15	17	14	10	10	12	16	11	134	13.4
Other Accidents	39	14	6	11	6	5	---	1	82	.65	52	49	66	59	68	75	49	42	64	606	60.6
Falling	11	13	7	7	4	2	1	2	47	.37	45	45	34	28	---	---	---	---	---	199	19.9
ORDER 2. HOMICIDE.																					
Murder	---	1	1	---	---	---	---	---	2	.01	9	9	6	2	2	---	---	---	---	30	3.0
Manslaughter	---	---	---	5	---	---	---	---	5	.03	1	2	4	1	10	9	9	2	2	45	4.5

ORDER 3. SUICIDE.																					
Gun-shot Wounds	3	---	---	7	---	---	---	3	13	.10	10	18	84	6	---	---	---	---	---	131	13.1
Cut, Stab	---	1	---	---	---	3	---	---	4	.03	11	6	3	10	---	---	---	---	---	34	3.4
Poisoned	4	6	1	3	---	1	---	2	17	.13	20	16	18	26	---	---	---	---	---	97	9.7
By Opium	---	6	---	1	---	1	---	---	8	.06	8	8	---	---	---	---	---	---	---	24	2.4
Drowning	3	5	4	3	---	1	4	---	20	.15	19	28	11	17	---	---	---	---	---	95	9.5
Hanging	3	5	2	1	1	3	1	---	16	.12	23	14	17	9	---	---	---	---	---	79	7.9
Otherwise	1	1	---	2	---	---	---	---	4	.03	5	5	9	5	---	---	---	---	---	28	2.8
ORDER 4. EXECUTION.																					
Hanging	1	---	---	---	---	---	---	---	1	---	1	---	---	---	---	---	---	---	2	2	.2
CLASS VIII.—Unclassified.																					
Tumor	9	2	1	3	2	1	---	1	19	.15	37	24	---	5	11	17	16	24	16	169	16.9
Dropsy	11	15	12	20	6	7	3	9	83	.66	81	101	---	120	106	146	162	142	154	1095	109.5
Debility, Atrophy, Inanition	74	80	50	47	12	9	27	3	302	2.41	296	330	160	222	110	140	119	154	147	1980	198.0
Sunstroke	---	1	1	1	---	---	---	---	3	.02	8	29	5	7	4	1	2	3	2	64	6.4
Exhaustion	13	8	26	17	13	3	7	2	89	.71	87	71	---	5	---	---	---	---	---	252	25.2
Hemorrhage	12	9	2	3	2	1	3	---	32	.25	43	25	---	---	---	---	---	---	---	100	10.0
Abscess	1	10	1	7	2	2	1	1	25	.19	21	16	---	27	31	38	34	33	---	225	22.5
Sudden Death	2	---	1	10	---	---	2	---	15	.11	9	18	---	---	---	---	---	---	---	42	4.2
Other ill-defined causes	37	82	21	53	25	20	10	5	253	2.01	151	186	436	239	269	5	5	2	2	1548	154.8
Cause not stated	16	9	2	3	10	7	6	3	56	.44	90	197	305	437	342	343	386	409	442	3007	300.7

TABLE VIII.

DEATHS IN TOWNS, ALPHABETICAL ARRANGEMENT, DISTINGUISHED BY AGE, NATIONALITY AND SEASON.

TOWNS.	AGES.																									DEATHS BY SEASONS.					BIRTHS BY SEASONS.				
	Under 1 year.	1 to 5.	5 to 10.	10 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	80 to 90.	90 to 100.	Over 100.	Unknown.	Birthplace, Connecticut.	All other States.	Birthplace, Ireland.	Birthplace, Germany.	Birthplace, England.	Birthplace, Italy.	Birthplace, Sweden.	Birthplace, Canada.	All other For. Countries.	Unknown.	Deaths in Spring.	Deaths in Summer.	Deaths in Autumn.	Deaths in Winter.	TOTAL.	Spring.	Summer.	Autumn.	Winter.	TOTAL.
Andover			1		1				1	3	2	1			9										5	1	2	1	9	2	3	4	1	10
Ansonia	27	12	4	6	9	12	4	8	10	3	1	1			60	9	20	2	4			1	1		6	45	34	12	97	43	80	72	28	223
Ashford	2				2		1	1	1	4	5	2			13	4			1						6	4	5	3	18	3	3	1	1	8
Avon	4	2		2	1	1	2	1		4	4	1			14	5	2			1					5	7	5	5	22	4	3	10	5	22
Barkhamsted	1			1	3		3	2	1	5	6	2			15	3	1	1						4	4	7	5	8	24	3	3	2	8	16
Beacon Falls	2	1						1	2	1	1				5			2					1		4	2	2		8	1	1	3	4	9
Berlin	6	4	2	5			1	1	6	4	7	3			30	5	3					1			11	7	13	8	39	2	9	13	3	27
Bethany		1				2			2	2	3				7	3									1	4	1	4	10	3	1	1	4	9
Bethel	7	6	1	4	4	5	3	5	5	3	1	1			31	3	7		1				1	2	14	13	8	10	45	20	16	21	20	77
Bethlehem						2		1		3	2				7	1									1	3	2	2	8	5	1	5	3	14
Bloomfield	2	2	1	2	1	1	2		3	5	4	2			19	3		1	1				1		10	7	2	6	25	3	1	5	5	14
Bolton	1								3		3				7										1	3	2	1	7	1		1		2
Bozrah	2			1	2		2	1							4	1	3								1	3	1	3	8	7	2	2	2	13
Branford	19	5		1	5	5	5	8	5	5	3				40	3	9	2	2				4	1	15	15	20	11	61	28	23	27	27	105
Bridgeport	177	109	44	52	85	92	74	68	57	53	36	4			475	141	120	35	24	2		4	35	15	210	230	218	193	851	2 55	317	338	278	1188
Bridgewater		1			1		2	1	3	1	5				13	1									4	2	6	2	14	3	2	1	3	9
Bristol	22	7	2	3	15	5	7	10	13	13	9	1			72	12	14	1	1		1	1	2	3	20	28	38	21	107	51	42	44	28	165
Brookfield		1		1		1		2	2	5	4				15	1									6	3	3	4	16	5	2	8	5	20
Brooklyn	8	5		4	4	2	1	1	5	6	2				23	4	5					6			13	9	10	6	38	15	5	11	9	40
Burlington	6	2	1		5	2	2	3	3	6	5				20	1	2	9	1			2			9	10	6	10	35	10	13	10	9	42
Canaan	3		1		1	2	1	3	2	8	1				16	5	1								5	7	7	3	22	10	10	5	3	28
Canterbury	2							1	1	3	3				9	1									2	4	3	1	10	2	2	1		5
Canton	6	3	1	4	4	3	5	5	10	8	2				33	10		2	1		3	2			11	11	13	16	51	18	17	12	18	65
Chaplin	1			1			1	1		3	1				8										3	2	1	2	8	1	3	1	6	11
Chatham	3	2	1	1	1	2		4	4	11	2	1			23	4	3				1			1	7	9	6	10	32	4	11	7	4	26
Cheshire	1	2		2	1	2	1		4	7	5				16		4	2	3						4	6	12	3	25	5	7	8	7	27
Chester		1		1	2	1	1	1		4	3	1			13	1					1				4	4	3	4	15	2	6	8	8	24
Clinton	1	1	2			2	1	1	4	5	3	1			17	3		1							2	8	4	7	21	4	5	5	11	25
Colchester	3	3	1	1	8	5	2	5	2	8	8	2			37	4	7								12	10	15	11	48	17	17	13	14	61
Colebrook	2	2	4	1	4	1		1	2	3	5	1			20	5	1								9	3	8	6	26	6	2	5	4	17
Columbia	1	2	1			2	2	2	3	1	1				13	1							1			2	9	4	15	1	8	5	4	18
Cornwall						3		3	4	2	1				9	1	2	1							5	3		5	13	6	4	3	5	18
Coventry	5	1			5	2	2		2	4	5	1			24	2								1	6	9	6	6	27	14	7	11	7	39
Cromwell	6	2	3		8	2	3	1	2	5	3	1			22	5	3	1	1		4				12	8	6	10	36	3	9	6	7	25
Danbury	64	39	23	15	36	34	26	22	24	29	13	6		1	181	62	37	7	6	3		2	8	26	67	103	76	86	332	123	138	140	146	547
Darien	5	4	2		2	2	5	9	7	10	8	1			34	11	5	1	3			1			17	18	13	7	55	14	9	4	12	39
Derby	27	16	3	6	13	17	11	15	19	14	8	1		3	92	19	27	5	5			2	3		41	37	27	48	153	76	38	30	87	231
Durham	1			1			1	1	1	3	2	1			10			1							2	2	4	3	11	5	5	4	4	18

Eastford	1		1				1	2		3	1				7	2									2	1	3	3	9	6	4	5	4	19
Easton	1	1			2	1	4		2		4	4			18	1									5	5	2	7	19	1	2	3	5	11
East Granby						1	3			1	2				5		2								2	3	1	1	7	7		4	3	14
East Haddam	10	3		4	2	3	4	7	6	6	7				42	6	4								11	12	16	13	52	7	7	9	19	42
East Hartford	12	5	7	7	3	6	4	9	3	6	4				49	10	3	3	1						18	18	19	11	66	24	29	31	29	113
East Haven		1			1		1	2	4	5	4				17	1									9	5	3	1	18	3	2	1	5	11
East Lyme	7	1		1	2	2	2	3	10	7	5				34	4	1	1							14	16	7	3	40	12	12	8	12	44
East Windsor	8	2		3		6	3	7	6	8	7				28	5	5	7	2				3		16	14	12	8	50	14	20	16	25	75
Ellington	1	1		1		1		2	3	3	1	4			8	4		4					1		4	7	3	3	17	9	7	1	3	20
Enfield	17	12	6	7	17	14	11	10	12	9	10	1			71	5	29		9			12			40	34	31	21	126	39	59	34	32	164
Essex	6			2	3	3	2	3	3	7	5				26	5	1				2				6	9	8	11	34	7	7	4	5	23
Fairfield	17	4		7	8	6	1	1	7	8	6	3			41	10	9	3	3				1	1	21	18	11	18	68	18	23	4	13	58
Farmington	8	2	2	1	2	1	2	5	2	5	12				25	1	10	1	2			2	1		10	11	12	9	42	22	17	8	14	61
Franklin			3	1					3	4	5				14	2									2	3	7	4	16	2			2	4
Glastonbury	10	3	4	4	2	6	2	2	10	10	5				39	6	4	5	3				1		17	7	16	18	58	18	23	9	21	71
Goshen	1			1		1			1	2	2	1			6	3									1	2	2	4	9	3	6	5	4	18
Granby	1	2			2	2			3	2	3				13	2									2	7	4	2	15	2	5	4	4	15
Greenwich	27	21	3	9	10	8	11	17	12	17	14	5			76	41	19	12	6						34	43	40	37	154	35	48	36	43	162
Griswold	13	12	5	8	2	2	2	3	6	3	5	1			41	10	6		1			2		2	14	12	20	16	62	11	16	13	20	60
Groton	15	7	3	3	4	7	8	2	10	17	10	4			77	8	1	1				2	1		23	20	22	25	90	18	24	23	22	87
Guilford	7	1	1	1	1	2	2	5	6	7	6	1			31	4	2						2	1	5	13	14	8	40	12	17	11	9	49
Haddam	2	4	1	1	4	3	2	1	4	8	7	2			30		4				2	1		2	17	3	11	8	39	20	14	18	10	62
Hamden	14	2	5	3	5	2	1	1	4	6	3				35	4	5	2							12	9	13	12	46	15	25	20	11	71
Hampton	2			1	1	2		2	2	2	1				10	2	1								6	3	2	2	13	4	3			7
Hartford	205	126	57	52	95	89	100	89	111	90	45	8			624	149	201	39	25			7	22		268	311	240	248	1067	300	325	324	301	1250
Hartland					2				1	4	1				8										1	3	1	3	8	2				2
Harwinton		1		2			2	1	3	2	2	2			11	2			1				1			3	7	5	15	4	6	3	1	14
Hebron	4				1	1		2		6	1				10	3		1					1		3	4	4	4	15	4	8	6	3	21
Huntington	6	4	1	7	6	6	6	6	9	12	6				44	9	9	1	1			1	2	2	16	18	22	13	69	20	18	33	21	92
Kent	5					2	1		6	3	2	2			14	3	3				1				4	7	6	4	21	6	7	7	8	28
Killingly	32	16	1	5	6	8	5	9	16	24	14	2		1	76	37	3	1	3			8		11	46	37	28	28	139	47	58	45	46	196
Killingworth								1	2	4	4				10				1						4	2	5		11	2	3	2	1	8
Lebanon	2	1			2	1	1	1	3	5	5				12	5	1	1			1			1	4	5	8	4	21	10	12	3	2	27
Ledyard	3	1	1	1	2		1	2	1	5	1				15	1						2			7	6	3	2	18	2	5	3	1	11
Lisbon		1			2	2		2	2		1				7		3								1	6	3		10	3	4	2	5	14
Litchfield	7			2	6	3	8	3	10	3	4	2	1		30	6	6		4				3		12	22	6	9	49	11	13	18	9	51
Lyme					2			1	2	2	1				7	1									4	2	1	1	8	2		3	2	7
Madison	1				1	3	2	3	4	2	6				20		2								9	5	5	3	22	5	7	1	6	19
Manchester	32	10	5	5	14	12	9	4	12	7	9	3		1	79	5	24	7	3		3		2		31	31	32	29	123	40	46	43	49	178
Mansfield	3	1			1	1	1		4	6	4	1			14	4	1		2		1				7	7	6	2	22	6	5	4	10	25
Marlborough	3			2		1				1	2			1	10										1	5	3	1	10	3	1	4	2	10
Meriden	97	69	35	20	46	29	20	32	34	26	11	2		5	277	41	38	27	17	1	4	10	8	3	98	129	99	100	426	183	195	188	167	733
Middlebury	3	1		1	1			1		1	1				7	1	1									3	3	3	9	4	1	2	4	11
Middlefield	1	2		1	1		3	4	1	1	2				10	1	2	1				1	1		8	3	3	2	16	4	4	6	7	21
Middletown	27	11	7	12	28	25	41	45	36	43	17	4			149	40	69	12	2	2	4		5	13	72	87	69	68	296	73	82	80	65	300
Milford	6	4	1	1	4	6	4	5	5	8	3	2		1	43	3	2		1				1		13	17	9	11	50	12	13	19	18	62
Monroe	1				1	1	3		6	7	3	3			24						1				7	4	6	8	25	2	2	3	4	11
Montville	9	1		3	1	3	1	5	7	2	10	1			37	2	2	1	1						10	9	9	15	43	13	16	5	12	46

TABLE VIII—CONTINUED.

TOWNS.	AGES.																								DEATHS BY SEASONS.					BIRTHS BY SEASONS.				
	Under 1 year.	1 to 5.	5 to 10.	10 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	80 to 90.	90 to 100.	Over 100.	Unknown.	Birthplace, Connecticut.	All other States.	Birthplace, Ireland.	Birthplace, Germany.	Birthplace, England.	Birthplace, Italy.	Birthplace, Sweden.	Birthplace, Canada.	All other For. Countries.	Unknown.	Deaths in Spring.	Deaths in Summer.	Deaths in Autumn.	Deaths in Winter.	TOTAL.	Spring.	Summer.	Autumn.	Winter.	TOTAL.
Morris					1	1	1	1	2	2					3	2	2	1							1	2	2	3	8	3	2	1	1	7
Naugatuck	21	7		5	14	13	11	11	12	10	3	1			65	5	26	2	4		4		1	1	30	30	29	19	108	47	54	43	53	197
New Britain	73	37	12	12	33	25	21	19	35	31	12				168	23	78	17	8		11	1	2	2	67	102	77	64	310	128	145	104	121	498
New Canaan		3			5	4	4	3	3	7	5				17	14	2					1			10	10	9	5	34	17	11	13	10	51
New Fairfield						2			1	3	4				8	2									3	3	2	2	10	3		3	3	9
New Hartford	19	4	4	1	8	4	3	3	2	6	4	1			38	6	5	1	2			6		1	17	16	14	12	59	17	24	14	21	76
New Haven	336	151	57	65	137	145	136	141	140	113	56	13			804	263	244	62	37	13		8	36	23	376	411	336	367	1490	607	688	612	584	2491
Newington	4	1	1	1	1		1	2		1	3				13		1	1							5	4	2	4	15	1	3	3	3	10
New London	59	15	16	24	22	16	16	17	23	25	20	2			176	40	27	3	7				2		73	86	51	45	255	70	81	69	74	294
New Milford	4			3	4	5	4	5	11	9	9	1			37	2	3		1		2		2	8	15	10	13	17	55	25	23	15	17	80
Newtown	11	1	3	7	6	4	3	9	8	8	14	1			49	4	19	1		1			1		25	20	16	14	75	13	17	10	15	55
Norfolk	4	2		1		1	3	2	2	4	1				12	4	2		2						7	4	4	5	20	9	4	8	4	25
North Branford	2								2	3	5	1			12	1									3	5	2	3	13	4	4	4	1	13
North Canaan	1	1		2	3	3		3	3	2					13	2	2						1		7	4	1	6	18	13	10	6	7	36
North Haven	5				2	2	2	1	2	2	2	1			14	3	1							1	2	9	2	6	19	4	8	6	10	28
North Stonington	3	2			2		2	1	5	8	3	1			21	3								3	9	5	5	8	27	8	5	4	5	22
Norwalk	65	23	5	15	16	29	15	32	23	27	15	1			159	50	27	10	6				14		72	82	59	53	266	82	109	95	95	381
Norwich	75	16	14	18	23	31	28	37	38	24	20	6			192	35	66	9	9			10	7	2	86	90	79	75	330	133	128	128	136	525
Old Lyme		3			2	2		3	3	2	1				15	1									1	4	5	6	16	3	9	4	6	22
Old Saybrook	6	3	1		2	1	1	2	2	7	4	1			24	5	1								6	12	7	5	30	10	9	7	4	30
Orange	7	3	3	3	5	5	2	7	8	12	8				45	12	2	1	2				1		21	13	13	16	63	15	20	18	12	65
Oxford	5	1		3	1		2	1	4	4	1	1			19	2							2		5	7	6	5	23	5	11	6	3	25
Plainfield	16	13	4	6	4	2	4	3	6	7	5				45	16	4					5			29	21	13	7	70	24	34	23	14	95
Plainville	3	6	3	3	2	1	4	4	4	3	4	1			26	6	5		1						6	11	9	12	38	8	2	7	5	22
Plymouth	4				1	5	1	2	7	2	3				12	2	7	2					2		3	5	8	9	25	9	9	15	10	43
Pomfret	6	2		1	4	1	1	2	6	7	4	1			23	7	4						1		9	11	8	7	35	5	8	4	8	25
Portland	25	11	3	4	4	8	3	3	14	8	10	2			65	4	18	1	1		6				19	23	32	21	95	41	35	49	32	157
Preston		6	1	1		2			6	11	2	4			18	5	6	3	1						11	7	5	10	33	13	13	12	13	51
Prospect				1					1		2				4										2	1	1		4	1		1	4	6
Putnam	35	33	10	9	8	7	4	7	9	15	7	1			97	21	8					17	1	1	26	43	55	21	145	43	51	39	46	179
Redding	5	1	2	1	2	3	2	1	3	2	6	1			26	2	1								6	8	9	6	29	8	9	9	3	29
Ridgefield	6			1	3	1	4	2	5	7	8	2	1		29	6	3	1	1						7	15	11	7	40	12	12	7	7	38
Rocky Hill	3					1	2	2	2	3	1	2			14		2								6	3	4	3	16	8	9	4	6	27
Roxbury	8	1			1	2	5			5	4				23	1	1		1						10	7	4	5	26	4	7	5	1	17
Salem											1	1			2										2				2	3	2	2	1	8
Salisbury	3	4	1	1	6		5	5	10	13	4	1			19	13	7		3				1	10	18	10	14	11	53	18	23	10	17	68
Saybrook	2			2	1	1	1		1	7	1				12	3							1		5	3	2	6	16	6	8	6	5	25

Scotland	1					1		3	4	3	3	1			12	2	2								3	3	4	6	16	2	2	2	3	9
Seymour	9	5	1	4	3	2	3	6	7	6	1				30	3	9	2	1				2		8	12	16	11	47	38	11	20	20	89
Sharon	3	2		4	6	1	1	2	3	5	4			3	23	5	4					1	1		8	10	6	10	34	5	12	16	10	43
Sherman	1						1		1	1	1				2	2	1								2	1		2	5	4	5	4	1	14
Simsbury	1			2	2		2	1	7	5	5	1		1	19	2							2	4	3	9	9	6	27	5	11	7	5	28
Somers	3	2	1	1	4		2	1	5	2	6	1			22	3	2					1			9	8	3	8	28	9	6	11	8	34
Southbury	2				3		2	2	2	1	3		1		14	1	1								5	4	3	4	16	5	5	5	7	22
Southington	11	5	3	3	5	2	1	5	9	11	5				41	3	9	4	2				1		13	13	13	21	60	35	33	22	24	114
South Windsor	6	3	2	1	2	3	2	1	6	4	1				24	5	2								9	9	10	3	31	7	8	7	6	28
Sprague	2			1	1	1	2	4	2	2					6	2	5		1			1			3	3	4	5	15	5	8	10	8	31
Stafford	9	7	3	3	7	5	3	2	7	13	6				41	9	5	4	1			5			17	13	15	20	65	26	25	30	26	107
Stamford	74	27	10	13	20	20	23	25	27	21	19	5		1	154	67	37	10	2		1	1	4	9	58	112	70	45	285	85	117	110	106	418
Sterling	2	1		1	1	2	1		1	1	3			2	11	3		1							5	3	4	3	15	5	4	1	1	11
Stonington	17	10	1	9	8	7	14	11	24	14	15				72	24	28		1				5		33	33	37	27	130	26	43	36	32	137
Stratford	17	1	6	5	7	7	7	5	5	6	3	1			49	7	9	2	2				1		19	9	16	26	70	19	17	5	22	63
Suffield	10	3		1	2	2	3	2	3	7	3				25	5	5	1							10	13	7	6	36	10	13	21	8	52
Thompson	52	6	2	3	10	4	3	9	7	4	9				54	20	4				6	16	2	7	22	28	32	27	109	29	26	19	28	102
Thomaston	12	3		1	4	4	5	5	6		5	1			28	1	6	4	4				3		12	10	12	12	46	26	21	16	16	79
Tolland	1			1	1				4	5	3				5	8								2	4	4	4	3	15	6	8	5	5	24
Torrington	12	4	1	4	12	3	1	5	4	9	7	1		1	38	10	7	7	2						12	13	19	20	64	22	25	25	16	88
Trumbull	1	2	2		1		1	3	5	3	3	1			20			2							7	6	2	7	22	3	6	6	2	17
Union	1	3	3	3			2	2		2		1			11	5						1			2	3	3	9	17	1	4	4		9
Vernon	34	16	20	8	18	6	13	18	13	4	11	1			93	14	22	20	3		3	1	2	4	36	55	39	32	162	65	54	61	46	226
Voluntown	5	4	4		5	1	1	2	2	2	2				17	7	1					3			10	3	10	5	28	8	4	10	8	30
Wallingford	24	13	3	4	11	10	10	3	6	9	7				59	12	9	7	2		1			10	28	23	17	32	100	39	42	33	38	152
Warren	1	1				1	1		2	4	3				7	3		3							3	5	2	3	13	1	2	2	1	6
Washington	3			1	1	2		1	2	4	5				16	2	1								7	4	3	5	19	8	8	12	7	35
Waterbury	158	57	18	28	52	40	37	42	32	25	18	1	2		307	53	104	4	11		3	17	11		121	160	112	117	510	235	240	274	267	1016
Waterford	9	1	2	2	5	4	3		8	9	10	2			48	3	2					1	1		14	11	18	12	55	13	9	12	7	41
Watertown	8	1	2	4	1	1	2	2	5	3	3	2			26	1	6						1		14	6	10	4	34	11	10	17	12	50
Westbrook	2	1	1	2			1	1	2	3	2	2			15	2									4	6	5	2	17	3	3	5	3	14
West Hartford	4	5	1		4	3	1	2	4	4	2				22	2	3					1	1		13	6	7	4	30	8	5	5		18
Weston	2	1		1	2		1	2	5	2	2	1			16	2	1								9	5	5		19	8	4	5	2	19
Westport	4	2	1	8	9	1	4	7	10	12	5	2			45	8	10		2						12	20	21	12	65	15	18	18	16	67
Wethersfield	4		1	1	5	2	3	1	2	10	4				26	1	3			1		2			9	9	7	8	33	6	10	7	4	27
Willington		1	1			1	1	1	4	2	3	1			10	3	2								3	4	4	4	15	4	3	8	5	20
Wilton	3	1	3	2	1	1	3	2	8	2	2	1			16	8	1	1	1		1		1		3	8	8	10	29	4	9	8	5	26
Winchester	11	2	3	2	5	7	5	7	13	10	11	1	1		47	15	11		3				2		24	26	20	8	78	39	20	22	25	106
Windham	31	14	4	8	12	13	16	13	18	18	12	2		1	99	18	20	1	9			10	1	4	38	60	31	33	162	68	61	58	55	242
Windsor	10	3		2	3	5	9	4	6	4	4	3			34	8	4	1	2				1	3	15	12	17	9	53	14	19	15	10	58
Windsor Locks	11	4	3	4	10	8	7	8		2					31	6	13	1	4	1			1		14	15	14	14	57	11	16	17	17	61
Wolcott		1	1			1	2		1		2				8										1	2	5		8		2	4	1	7
Woodbridge						3		3	1	4	5	1			17										5	3	4	5	17			3	4	7
Woodbury	2	1		1	2	1	1		4	4	2	3			17	1	1		2						4	3	10	4	21	8	6	9	8	31
Woodstock	7	3	4	3	2	2	2	2	3	19	8				39	10	2		1		2	1			5	13	19	18	55	10	9	5	9	33
Total	2440	1135	494	625	1086	986	938	1035	1300	1345	941	176	6	22	7782	1725	1675	394	284	25	69	180	231	164	3128	3525	3039	2837	12529	4213	4577	4276	4110	17176

Recapitulation of Table VIII.

AGES.	1889, Total.	1888, Total.	1887, Total.	1886, Total.	1885, Total.	1884, Total.	1883, Total.	1882, Total.	1881, Total.	1880, Total.	Per Cent. to Total Mortality. 1889.	1888.	1887.	1886.	1885.	1884.	1883.	1882.	1881.	1880.
Deaths under 1 year	2,440	2,525	2,544	2,441	2,454	2,519	2,422	2,268	2,229	2,159	19.4	19.4	20.5	21.	20.4	22.2	20.3	19.4	20.4	20.5
from 1 to 5	1,135	1,166	1,191	1,069	1,244	1,140	1,241	1,097	1,040	1,150	9.0	8.9	9.5	9.2	10.3	10.1	10.4	9.6	9.6	11.
Total, First Period, Infantile	3,575	3,691	3,735	3,510	3,698	3,659	3,663	3,365	3,269	3,309	28.5	28.4	30.1	30.2	30.7	32.3	30.7	29.	30.	31.5
Deaths from 5 to 10	494	508	455	411	465	447	599	540	425	357	3.9	3.9	3.6	3.6	3.9	3.9	5.	4.6	3.9	3.4
10 to 20	625	631	595	618	610	504	602	642	579	582	4.9	4.9	4.7	5.3	5.	4.4	5.1	5.5	5.3	5.4
Total, Second Period, Youth	1,119	1,139	1,050	1,029	1,075	951	1,201	1,181	1,004	939	8.8	8.7	8.4	8.9	8.9	8.3	10.1	10.1	9.2	8.8
Deaths from 20 to 30	1,086	1,090	1,024	975	1,017	999	1,028	1,091	1,033	857	8.6	8.4	8.2	8.4	8.4	8.8	8.6	9.4	9.5	8.2
30 to 40	986	987	915	905	864	791	897	832	848	724	7.9	7.6	7.3	7.8	7.3	6.9	7.5	7.1	7.7	6.9
40 to 50	938	1,000	914	838	900	759	813	879	751	742	7.6	7.7	7.3	7.2	7.5	6.7	6.8	7.5	6.9	7.1
50 to 60	1,035	1,016	1,001	964	985	898	919	876	851	796	8.2	7.8	8.	8.3	8.2	7.9	7.7	7.5	7.8	7.4
Total, 3d Period, Prod. Age	4,045	4,093	3,854	3,682	3,766	3,447	3,657	3,678	3,483	2,119	32.2	31.5	30.9	31.7	31.2	30.3	30.6	31.5	31.9	29.6
Deaths from 60 to 70	1,300	1,334	1,272	1,189	1,213	1,101	1,072	1,082	1,029	923	10.3	10.2	10.2	10.2	10.2	9.7	9.	9.3	9.4	8.8
70 to 80	1,345	1,487	1,336	1,168	1,186	1,224	1,227	1,157	1,130	1,122	10.7	11.4	10.7	10.1	9.8	10.8	10.3	9.8	10.3	10.7
80 to 90	941	1,012	841	798	839	743	811	817	741	725	7.5	7.8	6.7	6.9	6.9	6.5	6.8	7.1	6.8	6.9
90 to 100	176	178	181	143	157	132	150	267	164	151	1.4	1.3	1.4	1.2	1.3	1.2	1.2	2.3	1.5	1.4
Deaths over 100	6	8	10	5	16	6	11	15	11	9		-----	.1	-----	.1	.1	.1	.1	.1	.1
Total, 4th Period, Old Age	3,768	4,019	3,640	3,303	3,411	3,206	3,271	3,338	3,075	2,930	30.0	31.	29.2	28.3	28.2	28.3	27.4	28.6	28.1	28.6
Age not stated	22	38	106	92	83	88	138	99	76	111	.1	.2	.8	.8	.7	.8	1.2	.8	.8	1.5
Grand Total	12,529	12,980	12,385	11,616	12,023	11,351	11,930	11,662	10,907	10,408	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

NATIONALITY.																				
D'ths of those born in Conn.	7,782	8,269	7,984	7,544	8,052	7,572	7,819	7,715	7,404	7,030	62.1	63.7	64.4	65.	66.9	66.7	65.5	67.	67.9	67.6
other States	1,725	1,626	1,460	1,342	1,316	1,212	1,250	1,279	1,105	1,105	13.7	12.5	11.7	11.6	10.9	10.7	10.5	11.	10.1	10.5
Total for the United States	9,507	9,895	9,444	8,886	9,368	8,784	9,069	9,092	8,509	8,140	77.6	76.2	76.3	76.7	77.8	77.4	76.	78.	78.	78.1
D'ths of those born in Ireland	1,675	1,696	1,613	1,461	1,446	1,299	1,381	1,300	1,251	1,216	13.3	13.	12.2	12.5	12.1	11.4	12.4	11.2	11.5	11.3
Germany	394	335	357	315	314	278	272	275	273	178	3.1	2.5	2.8	2.7	2.6	2.4	2.3	2.4	2.5	1.5
England	284	319	320	285	292	253	236	266	269	249	2.2	2.4	2.5	2.5	2.4	2 2	2.	2.3	2.4	2.
Italy	25	55	28	28	34	31	30	48	23	20	.1	.4	.2	.1	.3	.3	.2	.4	.2	1.6
Sweden	69	81	29	------	------	------	------	------	------	------	.5	.6	.2	------	------	------	------	------	------	------
Canada	180	192	165	173	123	146	134	156	162	------	1.4	1.4	1.3	1.5	1.	1.3	1.1	1.3	1.4	------
other For. Countries	231	228	128	186	173	302	220	216	106	604	1 8	1.7	1.2	1.7	1.4	2.7	1.8	1.8	1.	5.5
Total of Foreign Births	2,858	2,906	2,640	2,448	2,382	2,309	2,373	2,261	2,084	2,267	22.8	22.3	21.1	21.	97.6	97.7	19.9	19.4	19.1	21.
Nativity not stated	164	179	301	2 8	282	258	488	309	314	------	1.3	1.3	2.4	2.4	2.4	2.3	4.1	2.6	2.	------
Grand Total	12,529	12,980	12,385	11,616	12,033	11,351	11,930	11,662	10,907	10,408	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
SEASONS.*																				
Deaths in Spring	3,128	3,390	2,957	2,999	3,403	2,685	3,147	3,046	2,673	2,659	24.9	26.1	23.9	25.8	28.2	23.6	26.4	26.2	24.5	25.5
Summer	3,525	3,491	3,877	3,117	3,273	2,980	3,253	3,121	2,764	2,879	28.1	26.9	31 2	26.8	27.1	26.3	27.3	26.7	25.3	27.6
Autumn	3,039	2,951	2,703	2,820	2,577	2,998	2,658	2,768	2,784	2,417	24.2	19.9	21.8	24.3	21.7	26.4	22.3	23.7	25.5	23.2
Winter	2,837	3,148	2,848	2,680	2,780	2,688	2,872	2,727	2,686	2,453	22.6	24.2	22.9	23.1	23.	23.7	24.	23.4	24.7	23.5
Total	12,529	12,980	12,385	11,616	*12033	11,351	11,930	11,662	10,907	10,408	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
BIRTHS.																				
Births in Spring	4,213	4,010	4,163	3,896	3,808	3,876	3,843	3,538	3,591	3,391	24.4	23.7	25.	24.4	24.6	24.6	24.2	23,7	24.5	24.5
Summer	4,577	4,511	4,193	4,120	4,026	3,998	4,043	3,756	3,615	3,422	26.6	26.6	25.3	25.8	26.0	25.4	25.5	25.1	24.6	25.5
Autumn	4,276	4,344	4,231	4,045	3,929	4,003	4,085	3,932	3,663	3,540	24.8	25.7	25.5	25.4	25.3	25.4	25.9	26.4	25.1	25.5
Winter	4,110	4,013	3,996	3,873	3,733	3,881	3,885	3,712	3,747	3,476	23.9	23.7	23.3	24.4	24.1	24.6	24.4	24.8	25.7	25.2
Total	17,176	16,878	16,583	15,934	15,496	15,758	15,856	14,938	14,616	13,829	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

* A few not stated by seasons are distributed equally.

TABLE IX.

CAUSES OF DEATH BY MONTHS, AGE AND SEX, ALPHABETICALLY ARRANGED.

January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	M'ths not stated.	DISEASES.	Under 1.	1 to 5.	5 to 10.	10 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	80 to 90.	90 to 100.	Over 100.	Age not stated.	Male.	Female.	Sex not stated.	Total.
2	4	2	3	2	1	1	2	---	1	---	5	--	Abscess	4	---	---	3	3	---	---	6	4	2	1	--	--	--	13	10	--	23
---	---	---	---	---	---	---	1	1	---	---	---	--	of Brain	---	---	---	---	---	---	1	---	---	1	--	--	--	--	1	1	--	2
---	---	---	---	---	1	---	--	---	---	---	---	--	of Kidney	---	---	---	---	---	---	---	---	1	---	--	--	--	--	---	1	--	1
---	1	---	---	---	---	---	---	---	---	---	---	--	of Liver	---	---	---	---	---	---	---	--	---	---	1	--	--	--	1	---	--	1
---	---	---	---	---	---	---	---	---	---	1	---	--	of Lung	---	---	---	---	1	---	---	---	---	---	--	--	--	--	1	---	--	1
---	---	---	---	---	---	1	---	1	---	---	---	--	of Perineal	---	---	---	---	1	---	1	---	---	---	--	-	--	--	1	1	--	2
---	---	---	1	---	---	---	---	---	---	---	---	--	of Throat	---	---	---	---	---	---	1	---	---	---	--	--	--	--	1	---	--	1
---	---	---	---	1	---	1	---	---	1	---	---	--	Abortion and Miscarriage	---	---	---	1	2	---	---	---	---	---	--	--	--	--	---	3	--	3
4	4	2	3	4	4	2	---	1	7	5	3	--	Accidents	1	4	---	2	4	6	7	8	2	5	--	--	--	--	33	6	--	39
1	---	1	1	---	1	---	1	---	---	1	---	--	Addison's Disease	---	---	---	---	2	1	--	1	---	1	1	--	--	--	5	1	--	6
1	1	6	1	2	---	2	1	3	1	3	2	--	Alcoholism	---	---	---	---	2	7	5	5	1	3	--	--	--	--	20	3	--	23
---	---	---	---	---	---	---	1	---	---	---	---	--	Amputation of Leg	---	---	---	1	---	---	---	---	---	---	--	--	--	--	1	---	--	1
2	1	2	1	2	1	5	3	1	3	---	1	--	Anæmia	8	---	---	2	2	---	3	2	3	2	--	--	--	--	8	14	--	22
---	---	---	---	---	---	---	---	---	---	---	1	--	Pernicious	---	---	---	---	---	1	---	---	---	---	--	--	--	--	---	1	--	1
1	---	---	---	---	---	1	1	---	1	---	---	--	Aneurism of Aorta	---	---	---	---	---	---	2	1	---	---	1	--	--	--	3	1	--	4
3	4	5	10	6	6	9	7	2	6	3	3	2	Angina Pectoris	1	1	---	2	3	7	4	7	16	17	8	--	--	--	34	32	--	66
38	49	40	36	43	39	30	31	47	42	42	46	--	Apoplexy	20	8	1	3	20	20	43	65	100	126	70	7	--	--	230	253	--	483
---	---	---	---	---	---	---	---	---	1	---	---	--	Arteritis	---	---	---	---	---	---	---	---	---	---	--	1	--	--	---	1	--	1
---	---	2	---	---	---	---	---	---	1	---	---	--	Arthritis	---	---	---	1	1	1	---	--	---	---	--	--	--	--	1	2	--	3
---	---	1	---	1	1	1	1	1	---	1	---	--	Ascites	---	---	---	---	---	---	1	2	1	3	--	--	--	--	2	5	--	7
---	---	---	1	---	---	---	1	2	---	3	---	--	Asphyxia	4	---	---	---	---	1	---	---	---	2	--	--	--	--	4	3	-	7
3	1	2	1	---	2	3	3	---	4	1	4	--	Asthma	6	1	---	---	---	---	4	3	3	5	2	--	--	--	11	13	--	24
2	1	2	4	1	---	1	4	1	1	1	1	--	Atalectasis	19	---	---	---	---	---	---	---	---	---	--	--	--	--	8	11	--	19

									1				Atheroma of Arteries									1						1			1
			2		2	5	1	2	3		2		Bladder, Disease of	1					1	2	8	4	1				15	2		17
		1	5	3	1	5		3	2		1		Brain, Disease of	5	5			2			2	3	1	3				9	12		21
4	2	12	8	14	9	13	11	10	6	10	3		Inflammation of	27	27	10	1	9	5	5	7	4	5	2				53	48	1	102
5	5	4	8	4	4	3	3	5	2	4	8		Softening of	1				1	1	2	7	10	18	13	2			31	24		55
26	22	21	31	23	27	28	21	23	15	25	21		Bright's Disease	1	3	2	11	21	33	39	54	58	45	13	2		1	155	128		283
24	28	33	36	18	19	22	11	20	28	26	32		Bronchitis	87	45	4	4	18	13	14	20	30	35	27				152	145		297
1	1	4	5	3	1	2	2	1	2	2	3		Capillary	14	3	2	1		2		1	1		2	1			9	18		27
1	6	2	2	1	1		3	3	2	2	8		Burns and Scalds	1	10	4	2	6		3	3		2					16	15		31
											1		Bedsores					1											1		1
4	7	11	8	11	7	12	7	10	3	8	3		Cancer			1	2	1	9	17	16	22	16	7				28	63		91
				1							1		of Abdomen								1		1					1	1		2
							1						of Axilla									1						1			1
	1		1							1	1		of Bladder					1				2		1				1	3		4
								1	1				of Bowels								1		1					2			2
6	1	5	3	2	1	3	3	2	3	2	7		of Breast						4	8	9	6	7	4				1	37		38
	1												of Chest									1						1			1
1	1	1			1		3	1		1	1		of Face					1				1	6	1	1			7	3		10
								1					of Foot									1						1			1
				1									of Hand and Arm										1					1			1
			1										of Jaw									1						1			1
				1									of Leg									1						1			1
			1			1		1	1				of Lip										1	2	1			3	1		4
2	1	2	1	1		1	2	1	1	1	2		of Liver							1	3	7	3	1				6	9		15
			1							1	1		of Mouth								1	1			1			3			3
1						2							of Neck							1		1	1					2	1		3
1	1	1	1				1				3		of Rectum								4	4						4	4		8
			1										of Right Testicle									1						1			1
								1					of Spleen								1							1			1
4	3	4	10	4	5	8	10	8	9	2	6		of Stomach					3		14	15	28	11	2				41	32		73
									1				of Thigh										1						1		1
	1	1	1		1	1	1		1		1		of Throat							1	1	3	3					4	4		8
	1												of Thyroid Gland										1						1		1

TABLE IX—CONTINUED.

January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	M'ths not stated.	DISEASES.	Under 1.	1 to 5.	5 to 10.	10 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	80 to 90.	90 to 100.	Over 100.	Age not stated.	Male.	Female.	Sex not stated.	Total.
---	1	---	---	---	---	2	---	---	---	---	---	--	Cancer of Tongue	---	---	---	---	---	---	---	2	---	1	--	--	--	--	1	2	--	3
---	---	1	---	---	---	---	---	---	---	---	---	--	of Urethra	---	---	---	---	---	---	---	1	---	---	--	--	--	--	---	1	--	1
4	2	4	4	---	4	5	7	3	4	3	6	--	of Womb	---	---	---	1	1	6	7	15	12	2	2	--	--	--	---	46	--	46
---	---	---	1	---	---	---	---	1	1	---	---	--	Carbuncle	1	---	---	---	---	---	---	---	2	---	--	--	--	--	1	2	--	3
1	---	1	---	---	---	---	---	1	1	3	---	--	Catarrhal Croup	2	4	1	---	---	---	---	--	---	---	--	--	--	--	3	4	--	7
---	---	---	1	---	---	---	1	---	---	1	---	--	Caries	---	---	---	---	---	1	---	---	1	1	--	--	--	--	2	1	--	3
5	4	7	3	8	1	5	4	9	5	3	2	1	Cause not reported	29	3	1	1	---	3	1	2	5	5	2	--	--	5	30	24	3	57
25	12	13	23	22	18	23	16	19	18	16	23	--	Cause Ill-defined	89	11	3	5	2	14	16	13	26	32	16	1	--	--	106	119	3	228
9	6	10	11	8	10	16	10	5	10	7	8	1	Cerebral Meningitis	36	34	10	10	6	4	3	3	2	1	1	1	--	--	61	50	--	111
4	3	5	2	4	8	3	4	1	1	4	1	--	Cerebro Spinal Meningitis	11	8	11	1	1	3	2	2	1	---	--	--	--	--	19	21	--	40
---	1	---	---	---	---	---	---	---	---	---	---	--	Chicken Pox	---	1	---	---	---	---	---	---	---	---	--	--	--	--	1	---	--	1
1	2	3	2	---	2	2	2	1	4	---	---	--	Childbirth	17	---	---	---	1	---	1	---	---	---	--	--	--	--	10	8	1	19
4	2	3	3	1	---	---	---	---	1	---	---	--	Accidents of	---	---	---	1	8	3	2	---	---	---	--	--	--	--	---	14	--	14
1	1	2	2	4	34	238	143	69	12	6	2	--	Cholera Infantum	435	73	5	1	---	---	---	---	---	---	--	--	--	--	285	229	--	514
2	3	---	---	2	2	14	7	4	2	---	---	--	Morbus	5	1	1	2	2	4	8	2	5	5	1	--	--	--	7	29	--	36
---	1	---	---	---	---	---	---	---	---	---	---	--	Cholæmia	---	1	---	---	---	---	---	---	---	---	--	--	--	--	---	1	--	1
---	---	1	2	---	---	---	---	---	---	---	1	--	Chorea	---	---	---	1	---	---	1	1	1	---	--	--	--	--	2	2	--	4
4	6	11	11	12	2	6	9	5	2	4	---	--	Circulatory System, Dis. of	2	3	2	3	4	2	10	3	13	22	8	--	--	--	39	33	--	72
5	7	4	5	7	3	5	10	6	3	6	2	--	Cirrhosis of Liver	---	---	--	1	2	3	16	16	18	5	2	--	--	--	34	29	--	63
---	---	1	---	1	---	---	---	---	---	---	---	--	Colic	1	---	---	---	---	---	---	---	1	---	--	--	--	--	1	1	--	2
---	---	1	---	---	---	2	---	---	---	---	---	--	Concussion of Brain	---	1	---	---	---	---	1	---	---	---	1	--	--	--	1	2	--	3
---	---	---	1	---	---	1	---	---	---	---	---	--	Congestion of Brain	---	1	---	---	---	---	1	---	---	---	--	--	--	--	1	1	--	2
105	132	125	136	123	131	129	109	103	149	116	107	--	Consumption	17	21	16	162	434	309	187	130	112	67	10	--	--	--	733	731	1	1465
---	---	---	---	---	1	1	---	---	---	---	---	--	Continued Fever	---	---	---	---	---	1	1	---	---	---	--	--	--	--	---	2	--	2

17	25	31	26	31	25	32	29	25	15	18	23	--	Convulsions	209	56	5	7	---	7	4	---	3	1	2	--	--	3	169	128	--	297
---	---	---	---	---	---	---	---	---	1	---	---	--	Coroner's Case	---	---	---	---	---	1	---	---	---	---	--	--	--	--	---	1	--	1
---	---	---	---	1	---	---	---	1	---	1	1	--	Croup	1	2	1	---	---	---	---	---	---	---	--	--	--	--	2	2	--	4
12	7	23	10	3	9	3	5	9	14	18	16	--	Membraneous	23	71	33	1	---	---	---	---	---	1	--	--	--	--	70	59	--	129
4	1	---	2	5	---	5	---	2	---	3	---	--	Cyanosis	22	---	---	---	---	---	---	---	---	---	--	--	--	--	14	8	--	22
1	1	3	2	3	2	1	1	3	4	2	1	--	Cystitis	---	---	---	---	---	---	---	2	6	11	5	--	--	--	21	3	--	24
23	10	18	31	13	21	38	26	30	23	22	17	--	Debility, Atrophy, Inanit.	190	2	---	---	---	6	3	10	22	15	20	2	--	2	147	122	3	272
1	1	---	---	---	---	4	---	3	---	---	---	--	Delirium Tremens	---	---	---	---	---	5	3	1	---	---	--	--	--	--	9	---	--	9
2	3	1	1	2	3	9	3	12	3	1	5	--	Dentition	31	14	---	---	---	---	---	---	---	---	--	--	--	--	31	14	--	45
5	2	---	4	7	1	2	2	7	3	7	7	--	Diabetes	---	1	2	4	3	2	5	8	16	5	1	--	--	--	28	19	--	47
8	4	1	1	2	6	7	7	5	5	2	6	--	Diarrhœa	2	4	4	2	3	2	5	7	10	11	4	--	--	--	32	22	--	54
13	5	8	3	3	29	98	41	22	16	9	5	-	Infantile	219	32	1	---	---	---	---	---	---	---	--	--	--	--	152	98	2	252
---	1	---	---	2	4	2	1	2	3	---	---	--	Digestive System, Dis. of	4	2	1	---	1	2	---	---	3	2	--	--	--	--	7	8	--	15
40	65	45	61	39	37	33	40	46	59	56	61	--	Diphtheria	34	288	193	55	5	2	4	1	---	---	--	--	--	--	280	301	1	582
6	9	7	5	12	8	7	7	6	8	3	6	--	Dropsy	2	1	1	2	3	1	8	15	15	22	14	--	--	--	34	50	--	84
10	2	2	3	7	20	14	12	7	7	3	1	--	Drowning	1	12	11	27	15	7	7	3	5	---	--	--	--	--	75	13	--	88
3	---	---	2	3	3	31	54	27	14	5	1	--	Dysentery	21	21	4	8	11	9	7	12	17	16	15	2	--	--	66	77	--	143
3	---	1	---	2	---	1	2	2	1	---	1	--	Dyspepsia	6	---	1	---	---	---	---	3	2	1	--	--	--	--	7	6	--	13
---	---	---	1	---	---	---	---	---	---	---	---	--	Eczema	1	---	---	---	---	---	---	---	---	---	--	--	--	--	1	---	--	1
---	1	---	---	---	---	---	---	---	---	---	---	--	Elephantiasis	---	---	---	---	---	---	---	---	1	---	--	--	--	--	---	1	--	1
---	1	1	1	2	1	---	---	---	1	1	---	--	Embolism	1	---	---	---	---	2	1	1	1	2	--	--	--	--	3	5	--	8
---	---	1	---	---	---	---	---	---	---	---	---	--	Empyæmia	---	---	---	---	---	---	1	---	---	---	--	--	--	--	1	---	--	1
1	1	1	---	---	---	1	1	---	---	---	2	--	Emphysema	1	1	---	---	---	1	---	---	2	1	1	--	--	--	5	2	--	7
---	1	---	1	1	---	1	1	---	---	---	---	--	Encephalitis	2	---	1	1	---	---	---	1	---	---	--	--	--	--	2	3	--	5
---	---	---	---	---	---	---	---	---	---	---	1	--	Endarteritis	---	---	---	---	---	---	---	---	1	---	--	--	--	--	---	1	--	1
3	5	9	5	5	6	5	5	5	4	5	4	--	Endocarditis	---	---	2	6	3	4	5	6	13	16	6	--	--	--	28	33	--	61
4	5	4	4	11	5	17	13	23	12	5	4	--	Enteritis	42	8	3	1	3	4	10	6	8	12	10	--	--	--	54	53	--	107
2	3	4	4	4	5	1	---	2	3	7	4	--	Epilepsy	---	2	---	4	13	7	5	4	1	2	1	--	--	--	21	18	--	39
4	3	4	5	1	2	---	1	---	---	---	---	--	Erysipelas	7	1	---	---	---	---	1	2	2	4	3	--	--	--	15	5	--	20
10	6	11	7	7	3	8	7	9	5	9	9	--	Exhaustion	31	3	1	3	4	2	5	5	15	13	8	1	--	--	51	39	1	91
---	---	---	1	---	---	---	---	---	---	---	---	--	Exposure to Cold	---	---	---	---	---	---	---	---	---	---	1	--	--	--	1	---	--	1
1	4	3	5	2	4	5	1	3	7	4	1	--	Falling	2	---	---	2	3	7	4	9	5	5	3	--	--	--	31	9	--	40

TABLE IX—CONTINUED.

January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	M'ths not stated.	DISEASES.	Under 1.	1 to 5.	5 to 10.	10 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	80 to 90.	90 to 100.	Over 100.	Age not stated.	Male.	Female.	Sex not stated.	Total.
---	23	---	---	---	---	---	---	---	---	---	---	--	Fall of Building	---	---	1	2	5	4	4	3	2	2	--	--	--	--	18	5	--	23
---	---	---	1	---	---	---	---	---	---	---	---	--	from Horse	---	---	---	---	1	---	---	---	---	---	--	--	--	--	1	---	--	1
---	---	---	---	---	---	---	---	---	---	---	1	--	Fistula	---	---	---	---	---	---	---	---	---	1	--	--	--	--	1	---	--	1
---	---	---	---	---	---	---	---	---	1	---	---	--	Found Dead	---	---	---	---	---	---	---	---	---	---	--	--	--	1	1	---	--	1
2	5	5	3	2	4	3	7	3	2	2	4	--	Fractures and Contusions	---	3	---	---	6	3	6	9	6	4	4	1	--	--	32	10	--	42
1	---	---	---	1	---	---	1	---	---	---	---	--	Fracture of Hip	---	---	---	---	---	---	---	---	1	1	--	1	--	--	1	2	--	3
1	---	---	---	1	---	---	---	---	---	---	---	--	of Neck	---	---	---	---	---	---	1	---	---	---	1	--	--	--	1	1	--	2
---	---	1	---	---	---	---	---	---	---	1	---	--	of Rib	---	---	---	---	1	---	1	---	---	---	--	--	--	--	2	---	--	2
5	---	2	2	---	1	2	2	2	3	---	1	--	of Skull	---	---	---	1	2	6	3	4	2	2	--	--	--	--	19	1	--	20
---	---	---	---	---	---	---	---	---	1	---	---	--	of Spine	---	---	---	---	1	---	---	---	---	---	--	--	--	--	1	---	--	1
---	1	1	---	---	---	---	---	---	---	---	---	--	Freezing	---	---	---	---	---	---	---	1	1	---	--	--	--	--	1	1	--	2
---	---	---	---	---	1	---	---	---	---	1	---	--	Gall Stones	---	---	---	---	---	---	---	1	---	1	--	--	--	--	---	2	--	2
2	---	1	2	1	2	2	3	1	1	1	---	--	Gastritis	2	---	---	---	1	1	3	3	3	1	2	--	--	--	6	10	--	16
---	---	---	---	---	---	1	---	---	---	---	1	--	Gonorrhœa	---	---	---	---	---	---	1	---	---	1	--	--	--	--	2	---	--	2
---	---	---	---	---	1	---	---	---	1	---	---	--	Gout	---	---	---	---	---	---	---	1	---	---	1	--	--	--	2	---	--	2
1	---	---	---	---	---	---	---	---	---	---	---	--	Graves' Disease	---	---	---	---	---	1	---	---	---	---	--	--	--	--	---	1	--	1
1	1	1	1	2	1	---	4	1	---	1	---	--	Hæmatemesis	3	---	---	4	---	---	---	2	2	1	1	--	--	--	8	5	--	13
---	1	---	---	---	---	---	---	---	---	---	---	--	Hæmatocele, Pelvic	---	---	---	---	---	1	---	---	---	---	--	--	--	--	---	1	--	1
---	1	1	1	---	---	---	---	1	1	1	---	--	Hæmaturia	1	---	---	---	---	---	---	1	1	1	2	--	--	--	5	1	--	6
---	1	---	---	---	---	---	---	---	1	1	2	--	Hæmoptysis	---	---	---	---	3	1	---	1	---	---	--	--	--	--	5	---	--	5
2	3	5	2	3	---	2	5	4	4	2	4	--	Hæmorrhage	7	---	1	3	4	4	6	---	6	2	3	--	--	--	20	16	--	36
---	---	---	---	---	---	---	---	1	---	---	---	--	from Bladder	---	---	---	---	---	---	---	---	---	1	--	--	--	--	1	---	--	1

---	---	---	1	---	---	---	---	---	---	---	---	--	Hanging, Execution	---	---	---	---	1	---	---	---	---	---	---	---	---	1	---	--	1
31	24	35	30	40	27	23	28	20	37	28	39	--	Heart Disease	20	1	6	13	20	23	35	59	62	91	31	1	--	--	180	182	--	362
4	1	2	3	1	2	2	1	2	1	2	2	--	Fatty Degeneration of	---	---	---	---	---	1	2	7	8	5	--	--	--	--	13	10	--	23
4	4	5	5	3	2	1	2	2	2	1	3	--	Hypertrophy of	---	---	---	---	1	2	5	7	10	7	2	--	--	--	15	19	--	34
23	17	16	10	18	13	16	16	16	13	8	15	--	Valvular, Disease of	6	1	---	4	6	18	16	29	40	37	23	--	--	1	87	93	1	181
2	2	4	2	2	1	5	2	2	5	3	2	--	Hemiplegia	---	---	---	1	---	1	3	4	7	10	6	--	--	--	17	15	--	32
1	1	2	4	4	3	---	---	6	3	3	3	--	Hepatitis	2	---	---	---	2	3	6	6	7	4	--	--	--	--	13	17	--	30
2	1	---	1	3	---	1	4	2	1	2	5	--	Hernia	1	---	---	---	---	1	1	6	8	2	2	1	--	--	5	17	--	22
---	---	1	---	---	1	---	---	---	---	---	---	--	Hip Joint Disease	---	---	---	---	---	1	---	1	---	---	---	---	---	--	2	---	--	2
---	---	1	---	---	---	---	---	---	---	---	---	--	Hodgkin's Disease	---	---	---	---	---	---	---	1	---	---	---	---	---	--	1	---	--	1
---	1	4	6	---	2	3	2	1	1	3	---	--	Hydrocephalus, not Acute	15	6	1	---	---	---	---	---	1	---	---	---	---	--	11	12	--	23
---	---	---	---	---	---	1	---	---	---	---	---	--	Hydropericardium	---	---	---	---	---	1	---	---	---	---	---	---	---	--	1	---	--	1
---	---	---	---	---	---	---	---	---	---	1	---	--	Hydrophobia	---	---	---	---	---	1	---	---	---	---	---	---	---	--	1	---	--	1
---	---	---	1	---	---	1	---	---	---	---	---	--	Hydrothorax	---	---	---	---	---	---	1	---	---	---	1	---	---	--	---	2	--	2
---	---	---	---	---	---	---	---	1	---	---	---	--	Hysteria	---	---	---	1	---	---	---	---	---	---	---	---	---	--	---	1	--	1
---	---	1	---	---	---	---	---	1	1	---	---	--	Imperforate Anus	3	---	---	---	---	---	---	---	---	---	---	---	---	--	3	---	--	3
---	---	---	2	---	---	---	---	1	---	1	---	--	Influenza	---	1	---	---	---	---	---	---	---	---	2	1	--	--	1	3	--	4
3	2	2	4	3	6	4	4	6	6	4	2	--	Insanity	---	--	---	1	2	4	5	12	12	8	2	--	--	--	18	28	--	46
---	---	---	1	1	---	1	---	1	1	1	1	--	Integumentary Syst., Dis. of	1	---	---	---	---	1	---	1	2	1	1	--	--	--	3	4	--	7
2	1	---	2	1	3	4	3	1	4	3	---	--	Intemperance	---	---	---	1	3	7	5	5	2	1	--	--	--	--	19	5	--	24
2	1	3	1	2	2	3	2	1	---	2	2	--	Intermittent Fever	1	2	1	2	3	1	4	1	3	1	2	--	--	--	12	9	--	21
1	1	4	2	2	1	2	1	4	4	1	2	--	Intestines, Obstruction of	2	1	---	1	2	1	2	4	5	4	3	--	--	--	17	8	--	25
---	---	---	---	---	---	---	---	1	---	---	---	--	Strangulation	---	---	---	---	---	---	---	1	---	---	---	---	---	--	---	1	--	1
---	---	---	---	2	1	2	---	2	1	---	1	--	Ulceration of	1	---	---	2	---	2	---	1	1	1	1	--	--	--	4	5	--	9
---	1	2	---	1	---	---	1	1	1	---	---	--	Intussusception	2	---	---	---	1	---	1	2	1	---	---	---	---	--	4	3	--	7
---	2	2	1	---	1	4	1	2	---	1	---	--	Jaundice	7	---	---	---	---	---	---	---	3	4	--	--	--	--	9	5	--	14
---	---	---	---	---	---	---	---	---	1	---	---	--	Kick of Horse	---	---	---	---	---	1	---	---	---	---	---	---	---	--	1	---	--	1
---	---	1	---	---	1	1	---	---	---	1	---	--	Kidney Disease	---	---	---	---	---	---	1	1	1	1	--	--	--	--	2	2	--	4
---	---	---	---	---	---	---	---	---	1	---	---	--	Killed by Machinery	---	---	---	---	---	---	---	---	1	---	---	---	---	--	1	---	--	1
---	---	---	---	1	---	---	---	---	---	---	---	--	Laryngismus Stridulus	1	---	---	---	---	---	---	---	---	---	---	---	---	--	1	---	--	1
2	3	1	3	3	---	---	1	1	3	2	2	--	Laryngitis	2	6	4	---	1	2	3	1	1	---	1	--	--	--	10	11	--	21

TABLE IX—CONTINUED.

January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	M'th not stated.	DISEASES.	Under 1.	1 to 5.	5 to 10.	10 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	80 to 90.	90 to 100.	Over 100.	Age not stated.	Male.	Female.	Sex not stated.	Total.
1						1							Larynx, Trachea, Disease of	1	1													2			2
			1										Leucocythemia								1								1		1
3	1	4	2	2	5	6	6	6	2	2	3		Liver Disease of	7				2	2	8	7	7	6	3				21	21		42
		2				1				2			Locomotor Ataxia							1	2		2					5			5
								2					Locomotory System, Dis. of								2							2			2
								1	1				Lupus								2							1	1		2
	1												Lymphatic System, Dis. of								1							1			1
3	5	2	2	5	2	7	4	4	7	2	4		Malarial Diseases	1	4	1	8	3	7	4	6	5	6	2				20	27		47
1	1												Fever				1	1										1	1		2
	1	2	1	1	2				1	5	1		Malformation, Congenital	13	1													7	7		14
					1								of Heart	1															1		1
	1						1		2	1			Manslaughter					2	2	1								3	2		5
2	3	4		5	4	6	6	8	6	2	1		Marasmus	41	5					1								28	19		47
3	9	5	11	8	13	12				1			Measles	18	29	10	2	1	1	1								36	26		62
	1		1	1				4	1	5	1		Meningitis	7	3	3				1								8	6		14
	1												Menstruation, Disorders of					1												1		1
1		1	1		1				1				Metritis				1	2	1		1								5		5
1	1				3	3	5	8	5	5	3		Miasmatic Disease	3		1	3	12	2	1	9	2	1					22	12		34
	1		1										Murder	1				1										2			2
1	3	2			1	5		1	1		2		Myelitis		2		1	1		3	2	5	2					12	4		16
		1		1	1	1	1		1				Necrosis							3	2		1					2	4		6
						1		1					Neglect	2														1	1		2
9	6	8	6	5	5	9	5	6	5	5	9		Nephritis	2	2	1	1	8	9	7	10	22	8	7	1			39	39		78

3	5	7	12	7	6	10	9	7	11	6	9	--	Nervous System, Disease of	2	2	4	2	2	6	5	9	17	19	20	4	--	--	43	49	--	92
---	1	---	---	---	1	---	---	---	---	---	2	--	Neuralgia	---	---	---	1	---	---	---	2	---	1	--	--	--	--	1	3	--	4
---	---	---	---	---	---	---	---	---	---	1	---	--	Neuritis Multipolar	---	---	---	---	1	---	---	---	---	---	--	--	--	--	---	1	--	1
75	60	66	64	48	38	66	60	62	61	53	53	--	Old Age	---	---	---	---	---	---	---	3	37	172	371	120	3	--	284	422	--	706
---	---	1	---	1	---	---	---	---	---	---	---	--	Otitis	---	---	1	---	1	---	---	---	---	---	--	--	--	--	1	1	--	2
---	1	---	1	1	---	---	2	2	---	---	---	--	Ovarian Tumor	---	---	---	---	1	2	1	1	2	---	--	--	--	--	---	7	--	7
---	2	---	1	---	2	1	1	---	1	1	1	--	Ovaries, Disease of	1	---	---	---	---	1	1	2	4	1	--	--	--	--	---	10	--	10
6	5	13	10	3	9	5	16	5	12	11	7	--	Paralysis	1	4	---	---	5	2	8	14	17	26	24	--	1	--	46	56	--	102
5	5	2	3	2	4	4	6	2	4	4	---	--	Paralysis Agitans	---	1	---	---	---	---	1	2	7	22	8	--	--	--	20	21	--	41
---	---	---	---	---	---	---	---	1	---	---	---	--	Face	---	---	---	---	---	---	---	1	---	---	--	--	--	--	---	1	--	1
---	---	---	---	---	---	---	---	1	---	---	---	--	Throat	---	---	---	---	---	---	---	---	1	---	--	--	--	--	1	---	--	1
2	---	1	---	1	---	1	1	1	1	---	2	--	Paraplegia	---	---	---	---	---	1	1	2	3	1	2	--	--	--	3	7	--	10
---	2	2	---	1	---	---	---	---	---	2	---	--	Paresis	---	---	---	---	---	2	3	1	---	---	1	--	--	--	7	---	--	7
1	1	1	1	3	2	1	1	---	2	1	3	--	Pericarditis	---	---	---	3	---	3	1	2	3	4	1	--	--	--	9	8	--	17
12	6	12	8	14	11	12	14	7	14	6	6	--	Peritonitis	7	6	7	22	25	17	10	12	11	3	2	--	--	--	54	68	--	122
---	---	---	---	---	---	---	---	1	---	---	---	--	Periostitis	1	---	---	---	---	---	---	---	---	---	--	--	--	--	1	---	--	1
4	1	---	---	3	---	2	4	1	2	---	---	--	Pernicious Fever	1	---	2	1	2	5	---	2	1	3	--	--	--	--	9	8	--	17
---	---	---	---	---	---	---	---	---	---	---	1	--	Pharyngitis	---	---	---	---	1	---	---	---	---	---	--	--	--	--	---	1	--	1
---	2	---	---	1	---	---	---	---	---	---	1	--	Phlebitis	---	---	---	---	---	---	1	---	---	2	1	--	--	--	3	1	--	4
---	---	1	---	---	---	---	---	---	1	---	---	--	Placenta Previa	---	---	---	---	---	2	---	---	---	---	--	--	--	--	---	2	--	2
2	3	1	5	4	1	1	2	1	1	3	5	--	Pleurisy	1	1	1	1	5	6	4	3	5	1	1	--	--	--	13	16	--	29
90	111	135	129	83	43	28	28	33	64	62	106	--	Pneumonia	130	88	22	49	55	72	95	99	119	112	62	8	1	--	475	436	1	912
---	---	1	---	---	1	---	---	1	---	---	---	--	Poison	---	---	1	---	---	1	1	---	---	1	--	--	--	--	1	2	--	3
---	---	---	---	---	---	1	---	---	---	---	---	--	Alcohol	---	---	---	---	---	---	---	---	---	---	--	--	--	--	1	---	--	1
---	---	---	---	1	---	---	--	---	---	---	---	--	Arsenic	---	---	1	---	---	---	---	---	---	---	--	--	--	--	1	---	--	1
---	---	2	---	---	---	---	---	---	---	---	---	--	Carbolic Acid	---	2	---	---	---	---	---	---	---	---	--	--	--	--	2	---	--	2
---	---	---	---	---	---	---	---	---	1	1	---	--	Chloral	---	---	---	---	---	1	---	---	---	1	--	--	--	--	2	---	--	2
---	---	1	---	---	---	---	---	---	---	1	---	--	Chloroform	---	---	---	---	---	---	---	---	1	---	--	--	--	1	2	---	--	2
---	---	---	---	---	1	---	---	---	---	---	---	--	Lead	---	---	---	---	---	---	1	---	---	---	--	--	--	--	---	1	--	1
---	---	---	---	---	---	---	---	---	1	---	---	--	Morphine	---	1	---	---	---	---	---	---	---	---	--	--	--	--	1	---	--	1

TABLE IX—CONTINUED.

January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	M'ths not stated.	DISEASES.	Under 1.	1 to 5.	5 to 10.	10 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	80 to 90.	90 to 100.	Over 100.	Age not stated.	Male.	Female.	Sex not stated.	Total.
---	---	---	---	---	---	---	---	---	---	1	---	--	Poison, Nitrous Oxide	---	---	---	---	---	1	---	---	---	---	--	--	--	--	1	---	--	1
---	1	---	---	1	1	---	---	---	---	---	---	--	Pott's Disease	---	---	---	1	1	1	---	---	---	---	--	--	--	--	2	1	--	3
1	---	---	---	---	---	---	---	---	---	---	---	--	Pregnancy Abdominal	---	---	---	---	---	1	---	---	---	---	--	--	--	--	---	1	--	1
12	23	12	15	15	28	22	24	16	18	15	19	--	Premature Birth	219	---	---	---	---	---	---	---	---	---	--	--	--	--	131	81	7	219
---	2	3	---	2	1	1	2	---	2	---	1	--	Prostatitis	---	---	---	---	---	---	---	---	4	8	2	--	--	--	14	---	--	14
---	---	2	5	---	1	---	---	---	---	1	---	--	Puerperal Convulsions	---	---	---	---	4	5	---	---	---	---	--	--	--	--	---	9	--	9
3	2	4	5	5	4	4	--	1	4	3	3	--	Fever	---	---	---	3	20	12	2	---	1	---	--	--	--	--	---	38	--	38
1	1	1	---	1	---	---	---	---	1	---	---	--	Hæmorrhage	---	---	---	---	2	2	---	---	1	---	--	--	--	--	---	5	--	5
---	---	---	---	---	1	---	---	---	---	---	1	--	Mania	---	---	---	---	2	---	---	---	---	---	--	--	--	--	---	2	--	2
---	---	2	1	---	---	---	---	---	1	---	---	--	Septicæmia	---	---	---	---	3	1	---	---	---	---	--	--	--	--	---	4	--	4
---	---	---	---	1	---	---	---	---	1	1	---	--	Purpura	1	---	---	1	1	---	---	---	---	---	--	--	--	--	1	2	--	3
4	4	4	4	1	3	---	3	1	3	2	1	--	Pyæmia	3	3	1	2	---	3	4	3	6	4	1	--	--	--	19	11	--	30
---	---	---	1	---	---	---	---	---	---	---	---	--	Pyelitis	---	---	---	---	---	---	---	---	---	1	--	--	--	--	1	---	--	1
---	1	---	---	1	---	1	---	---	1	---	1	--	Quinsy	---	2	1	---	2	---	---	---	---	---	--	--	--	--	1	4	--	5
3	---	---	---	---	---	---	1	1	---	---	---	--	Rachitis	2	3	---	---	---	---	---	---	---	---	--	--	--	--	1	4	--	5
5	6	12	7	17	11	10	17	13	14	15	6	--	Railroad Injuries	---	---	6	8	39	38	15	14	4	7	--	--	1	1	113	20	--	133
---	2	2	---	3	---	3	5	4	6	3	2	--	Remittant Fever	3	6	2	3	4	3	1	5	1	2	--	--	--	--	9	21	--	30
1	3	5	3	1	2	3	4	6	2	3	1	--	Respira System, Disease of	---	3	2	3	2	4	2	2	7	3	6	--	--	--	12	22	--	34
13	8	14	8	9	9	10	13	6	4	5	4	--	Rheumatism	1	---	3	8	10	16	9	16	17	15	8	--	--	--	54	49	--	103
1	---	---	1	---	---	---	---	---	---	1	1	--	Run Over by Cart	---	2	---	1	---	---	---	1	---	---	--	--	--	--	3	1	--	4
3	8	7	11	12	3	4	4	4	8	11	6	--	Scarlet Fever	8	41	24	5	1	2	---	---	---	---	--	--	--	--	30	51	--	81

---	2	5	1	4	---	2	3	4	1	1	2	--	Scrofula	8	2	2	1	5	2	1	1	2	1	--	--	--	--	14	11	--	25
---	3	---	1	---	2	4	5	5	4	---	2	--	Senile Gangrene	---	---	---	---	---	---	---	1	3	11	10	1	--	--	15	11	--	26
2	1	2	7	2	2	1	2	2	2	2	2	--	Septicæmia	---	2	1	3	3	7	4	3	3	1	--	--	--	--	10	17	--	27
1	1	1	1	1	1	---	---	1	---	1	---	--	Spina Bifida	7	---	---	1	---	---	---	---	---	---	--	--	--	--	5	3	--	8
2	---	3	2	1	1	3	6	4	2	4	3	--	Spinal Meningitis	11	7	1	3	1	2	2	---	3	1	--	--	--	--	13	18	--	31
2	2	2	2	2	1	4	5	1	1	2	---	--	Spinal Cord, Disease of	1	---	2	---	1	1	5	3	6	4	1	--	--	--	16	8	--	24
---	---	1	1	---	---	---	---	---	---	---	---	--	Spine, Injury to	---	---	---	---	---	---	1	---	---	1	--	--	--	--	2	---	--	2
---	1	---	---	---	---	---	---	1	---	---	---	--	Strangulation	---	---	---	---	---	---	1	1	---	---	--	--	--	--	2	---	--	2
---	---	---	---	---	1	---	---	---	---	---	---	--	Stricture of Oesophagus	---	---	---	---	---	---	---	---	1	---	--	--	--	--	1	---	--	1
1	1	4	5	8	6	7	4	7	8	10	8	--	Stomach Disease	3	1	---	4	5	7	8	10	11	16	4	--	--	--	31	38	--	69
---	---	---	---	---	---	2	---	---	---	1	---	--	Stomatitis	3	---	---	---	---	---	---	---	---	---	--	--	--	--	2	1	--	3
2	---	---	---	---	---	---	1	---	---	1	1	--	Sudden Death	---	1	---	---	---	---	---	1	1	2	--	--	--	--	2	3	--	5
1	1	2	4	---	2	1	1	2	1	1	---	--	Suffocation	5	3	---	---	1	2	2	2	1	---	--	--	--	--	7	9	--	16
---	---	---	---	---	---	1	---	---	---	---	---	--	Suicide	---	---	---	---	---	---	1	---	---	---	--	--	--	--	1	---	--	1
---	---	---	---	---	---	---	---	---	---	1	---	--	by Arsenic	---	---	---	---	---	1	---	---	---	---	--	--	--	--	1	---	--	1
---	---	---	1	---	---	---	---	---	---	---	---	--	by Cars	---	---	1	---	---	---	---	---	---	---	--	--	--	--	1	---	--	1
---	1	---	---	1	---	1	---	1	---	---	---	--	by Cut	---	---	---	---	1	1	---	1	---	1	--	--	--	--	4	---	--	4
3	---	1	5	2	2	1	1	2	---	2	2	--	by Drowning	---	1	3	1	4	6	2	2	1	1	--	--	--	--	20	1	--	21
---	1	---	3	1	1	2	2	1	---	1	1	--	by Gunshot	---	---	---	1	1	4	3	3	---	1	--	--	--	--	13	---	--	13
1	1	1	3	3	1	1	1	---	---	2	2	--	by Hanging	---	---	---	---	3	1	4	5	---	2	1	--	--	--	11	5	--	16
2	---	---	---	1	3	1	---	---	---	1	---	--	by Opium	---	---	---	---	2	2	1	2	1	---	--	--	--	--	7	1	--	8
---	---	---	---	---	1	1	---	---	---	---	---	--	by Paris Green	---	---	---	---	---	---	1	1	---	---	--	--	--	--	1	1	--	2
1	1	2	4	2	---	2	1	---	---	---	1	--	by Poison	---	---	---	1	1	2	3	1	3	1	2	--	--	--	10	4	--	14
---	---	---	---	---	---	2	---	1	---	---	---	--	Sunstroke	---	1	---	---	1	---	---	1	---	---	--	--	--	--	2	1	--	3
---	2	1	---	1	---	---	---	1	2	1	---	--	Syncope	---	---	1	---	---	---	1	1	2	2	1	--	--	--	5	3	--	8
---	3	---	1	---	1	---	---	---	---	---	---	--	Syphilis	1	1	---	---	1	1	---	---	1	---	--	--	--	--	3	2	--	5
1	7	4	5	3	4	9	13	15	7	6	1	--	Tabes Mesenterica	42	12	1	1	2	5	4	2	6	---	--	--	--	--	40	35	--	75
2	3	---	---	2	2	---	3	1	---	1	1	--	Tetanus	5	---	1	1	3	2	2	---	1	---	--	--	--	--	12	3	--	15
2	4	2	2	6	7	2	3	---	---	1	5	--	Thrombosis	2	---	1	---	---	5	2	3	13	6	2	--	--	--	16	18	--	34
---	1	---	---	---	---	---	---	---	---	---	---	--	Thrush	1	---	---	---	---	---	---	---	---	---	--	--	--	--	---	1	--	1
3	---	1	---	2	---	2	1	1	---	---	1	--	Trismus Nascentium	11	---	---	---	---	---	---	---	---	---	--	--	--	--	8	3	--	11

TABLE IX—CONTINUED.

January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	M'th not stated.	DISEASES.	Under 1.	1 to 5.	5 to 10.	10 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	80 to 90.	90 to 100.	Over 100.	Age not stated.	Male.	Female.	Sex not stated.	Total.
6	4	4	9	4	6	11	8	3	6	11	9	---	Tubercular Meningitis	36	28	3	2	4	4	3	1	---	---	---	---	---	---	47	34	--	81
1	---	---	---	---	---	---	---	---	---	---	---	---	Pharyngitis	---	---	---	---	---	---	1	---	---	---	---	---	---	---	1	---	--	1
2	1	2	2	4	6	4	11	4	3	5	9	---	Tuberculosis	5	3	---	10	4	15	7	2	5	1	1	---	---	---	25	28	--	53
---	---	---	2	---	4	1	1	1	2	2	2	---	Tumor	---	---	---	---	1	2	3	1	4	3	1	---	---	---	6	9	--	15
---	---	---	1	---	---	2	---	---	---	1	---	---	of Brain	---	1	---	---	---	---	---	1	1	1	---	---	---	---	1	3	--	4
---	---	---	---	1	---	---	---	---	---	---	---	---	Abdominal	---	---	---	1	---	---	---	---	---	---	---	---	---	---	---	1	--	1
---	---	---	---	---	---	---	1	---	---	---	2	---	Typhlitis	---	---	1	---	1	---	---	1	---	---	---	---	---	---	2	1	--	3
21	12	19	12	15	9	25	41	44	47	27	9	---	Typhoid Fever	3	8	17	49	96	37	19	15	19	12	5	---	---	1	144	137	--	281
3	1	---	1	1	4	4	6	5	2	3	3	---	Typho-Malarial Fever	---	1	1	2	8	9	4	---	6	1	---	1	---	---	18	15	--	33
---	1	---	1	---	---	1	2	2	1	---	1	---	Typhus Fever	1	---	---	2	4	1	---	---	1	---	---	---	---	---	4	5	--	9
2	---	2	2	1	2	2	3	1	3	2	2	---	Ulcer of Stomach	1	1	1	2	1	3	2	4	4	2	1	---	---	---	10	12	--	23
---	---	---	---	1	---	---	---	---	---	---	---	---	of Leg	---	---	---	---	---	---	---	---	1	---	---	---	---	---	1	---	--	1
1	---	---	1	---	---	1	1	1	---	1	---	1	Umbilical Hæmorrhage	6	---	---	---	---	1	---	---	---	---	---	---	---	---	2	5	--	7
1	1	2	3	5	4	2	4	2	4	3	3	---	Uræmia	1	---	1	3	3	3	8	3	4	3	4	1	---	---	15	19	--	34
1	---	---	---	1	1	---	---	---	---	---	---	---	Urinary Calculus	---	---	---	---	---	---	---	1	1	---	1	---	---	---	3	---	--	3
---	1	1	---	---	---	---	---	---	---	2	1	---	Urinary System Disease of	---	---	---	---	---	---	---	2	1	2	---	---	---	---	4	1	--	5
---	---	---	---	---	1	---	---	1	1	---	---	---	Urine, Suppression of	1	---	---	---	---	---	---	---	1	---	---	1	---	---	1	2	--	3
1	2	2	---	1	1	1	---	---	---	---	---	---	Uterine Disease	2	---	---	---	---	2	1	3	---	---	---	---	---	---	---	8	--	8
---	---	---	---	---	---	---	---	1	---	---	---	---	Hæmorrhage	---	---	---	---	---	---	---	---	1	---	---	---	---	---	---	1	--	1
---	---	---	1	---	1	---	---	---	---	---	1	---	Tumor	---	---	---	---	---	---	1	---	---	2	---	---	---	---	---	3	--	3
5	7	10	8	6	7	8	15	3	11	6	6	---	Whooping Cough	53	34	4	---	---	1	---	---	---	---	---	---	---	---	40	51	1	92
1	1	1	1	---	---	2	---	1	2	2	2	---	Wounds Gunshot	---	---	1	4	4	2	1	---	---	1	---	---	---	---	12	1	--	13
---	---	---	---	---	---	---	---	1	---	---	---	---	Wounds	---	---	---	---	---	---	---	---	1	---	---	---	---	---	1	---	--	1

TABLE X.

OCCUPATIONS AND AGES.

OCCUPATIONS.	15 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	80 to 90.	90 to 100.	Over 100.	Not stated.	Total, 1889.	Total, 1888.	Total, 1887.	Total, 1886.	Total, 1885.	Total, 1884.	Total, 1883.	Total, 1882.	Total, 1881.	Total, 1880.
Actor,	--	--	--	--	1	--	--	--	--	--	--	1	1	1	---	1	---	---	---	---	---
Actress	--	--	2	--	--	--	--	--	--	--	--	2	---	---	---	---	---	---	---	1	1
Agents	--	--	--	--	--	--	--	--	--	--	--	--	3	5	2	8	6	11	11	10	3
Architects	--	1	--	--	--	--	--	--	--	--	--	1	3	---	---	---	---	2	---	---	---
Army Officers	--	--	--	--	--	--	--	--	--	--	--	---	3	3	---	---	---	---	---	1	---
Artists	--	1	--	--	--	--	--	--	--	--	--	1	5	4	5	---	3	2	---	4	1
Athlete	--	--	--	--	--	--	--	--	--	--	--	---	---	---	---	---	1	---	---	---	---
Auctioneer	--	--	--	--	--	--	--	--	--	--	--	---	---	---	1	---	---	---	---	---	---
Augur Maker	--	--	--	--	--	--	--	--	--	--	--	---	---	1	---	---	---	---	---	---	---
Authoress	--	--	--	--	--	--	--	--	--	--	--	---	---	---	---	---	---	---	---	1	---
Axle Makers	--	--	1	--	--	--	--	--	--	--	--	1	---	---	1	---	1	---	---	---	---
Bag Cutter	--	--	--	--	--	--	--	--	--	--	--	---	---	---	---	---	1	---	---	---	---
Baggage Master	--	--	--	--	1	1	--	--	--	--	--	2	6	---	---	1	3	---	---	1	---
Bakers	2	--	2	--	--	--	--	--	--	--	--	4	8	4	7	3	10	7	3	4	5
Ball Player	--	--	--	--	--	--	--	--	--	--	--	---	---	---	---	---	1	---	---	---	---
Bankers	--	--	--	--	--	2	4	1	--	--	--	7	1	9	6	3	7	4	1	4	1
Barbers	--	1	7	--	2	--	--	--	--	--	--	10	19	17	5	14	12	9	6	3	1
Bar Tenders	--	--	1	--	--	--	--	--	--	--	--	1	15	10	8	8	2	2	---	3	3
Basket Makers	--	--	--	--	1	1	1	--	--	--	--	3	1	2	1	1	2	1	2	2	---
Belt Makers	--	--	--	--	--	--	--	--	--	--	--	---	1	1	---	---	---	---	---	---	---
Bill Posters	--	--	--	--	--	--	--	--	--	--	--	---	---	---	2	---	---	---	---	---	---
Blacksmith	1	5	3	5	11	7	10	3	1	--	--	46	37	54	46	42	36	54	28	37	35
Blaster	--	--	--	--	1	--	--	--	--	--	--	1	---	---	---	---	---	---	---	---	---
Bleacher	--	--	--	1	--	--	--	--	--	--	--	1	2	---	---	---	---	---	---	---	---
Block Maker	--	--	--	--	--	--	--	--	--	--	--	---	4	1	---	---	---	---	---	---	---
Boat Builders	--	--	--	--	--	--	1	1	--	--	--	2	4	---	1	1	---	3	---	---	---
Boatmen	--	--	--	1	--	--	1	--	--	--	--	2	---	4	2	1	2	9	4	---	---
Boiler Makers	--	1	--	1	1	--	--	--	--	--	--	3	1	5	2	2	---	1	---	---	---
Bolt Makers	--	1	1	1	--	--	--	--	--	--	--	3	---	---	---	2	---	---	---	---	---
Bookbinders	--	--	--	--	--	--	--	--	--	--	--	---	2	1	1	3	1	2	2	4	1
Book-keepers	--	5	5	3	3	3	4	1	--	--	--	24	32	14	17	16	18	25	14	11	6
Sewer	--	--	--	--	--	--	--	--	--	--	--	---	---	---	---	---	1	---	---	---	---
Shaper	--	--	--	--	--	--	--	--	--	--	--	---	---	---	---	---	1	---	---	---	---
Boot Makers	--	--	--	--	--	--	--	--	--	--	--	---	1	2	4	---	2	---	---	---	---
Bottlers	--	--	--	--	--	--	--	--	--	--	--	---	---	1	---	3	1	---	---	---	---
Box Makers	--	--	--	--	--	--	--	--	--	--	--	---	10	1	---	---	---	2	---	---	---
Brakemen	1	11	9	1	--	--	--	--	--	--	--	22	14	18	9	15	14	18	4	9	3
Brass Dipper	--	--	--	--	--	--	--	--	--	--	--	---	---	---	---	---	1	---	---	---	---
Finishers	--	--	--	--	--	--	--	--	--	--	--	---	19	1	1	1	1	---	---	---	---
Founders	--	--	--	1	1	--	--	--	--	--	--	2	1	---	---	3	---	---	---	---	---
Moulders	--	--	--	--	1	--	--	--	--	--	--	1	1	3	---	3	4	---	---	---	---
Rollers	--	--	--	--	--	--	--	--	--	--	--	---	---	---	---	---	2	---	---	---	---
Turners	--	--	--	1	--	--	--	--	--	--	--	1	1	1	1	1	1	---	---	---	---
Workers	1	2	--	--	--	--	--	--	--	--	--	3	3	3	1	---	---	---	---	---	---
Brewers	--	--	--	--	--	--	--	--	--	--	--	---	3	2	1	1	2	---	---	2	2
Bricklayers	--	--	--	--	--	--	--	--	--	--	--	---	3	2	3	1	-	---	---	---	---
Makers	--	--	--	--	--	--	--	--	--	--	--	---	3	1	1	1	1	2	2	5	4

TABLE X—CONTINUED.

OCCUPATIONS.	15 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	80 to 90.	90 to 100.	Over 100.	Not stated.	Total, 1889.	Total, 1888.	Total, 1887.	Total, 1886.	Total, 1885.	Total, 1884.	Total, 1883.	Total, 1882.	Total, 1881.	Total, 1880.
Bridge Builder	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	1
Tender	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--
Broker	--	--	1	1	1	--	--	1	--	--	--	4	1	5	1	3	2	3	2	2	1
Brush Maker	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--
Buffer	--	1	2	2	--	--	--	--	--	--	--	5	8	6	5	2	1	--	--	--	--
Builders	--	--	--	1	1	--	1	--	--	--	--	3	16	4	9	3	--	--	3	--	--
Burnishers	--	1	--	--	--	--	--	--	--	--	--	1	12	5	6	7	3	8	--	1	4
Butchers	1	3	4	4	3	5	4	2	--	--	--	26	25	17	16	17	12	25	9	13	9
Butler	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--
Button Maker	--	--	--	--	--	--	--	--	--	--	--	--	--	2	1	--	1	--	--	--	--
Cabinet Makers	--	--	--	2	1	3	3	1	--	--	--	10	11	4	4	6	5	6	3	5	1
Canal Gate keeper	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--
Carders	--	--	1	--	--	--	--	--	--	--	--	1	--	--	1	1	--	--	--	--	--
Card Coverer	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--
Car Driver	--	--	--	--	--	--	--	--	--	--	--	--	1	4	--	--	1	--	--	--	--
Carmen	--	2	1	1	3	1	--	--	--	--	--	8	--	2	5	3	2	--	2	1	1
Car Maker	--	1	--	--	1	--	--	--	--	--	--	2	--	1	--	1	--	--	--	--	--
Carpenters	--	9	12	16	24	30	21	14	--	--	--	126	94	79	80	65	83	78	60	60	65
Carpet Weavers	--	--	--	--	--	--	--	--	--	--	--	--	1	1	--	--	--	--	--	2	1
Car. Blacksmith	--	--	--	--	--	--	--	--	--	--	--	--	10	--	--	2	--	--	--	--	--
Makers	--	--	2	1	--	5	3	--	--	--	--	11	14	6	8	10	17	8	8	13	1
Painters	--	--	--	--	--	2	--	--	--	--	--	2	8	4	1	2	1	7	--	2	4
Trimmers	--	--	1	--	1	2	--	--	--	--	--	4	--	5	3	1	3	--	--	--	--
Cartridge W'kers	--	--	--	--	--	--	--	--	--	--	--	--	8	1	1	2	--	--	--	--	--
Carvers	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	1	2	--	2	1
Cashiers	--	--	--	--	--	--	--	--	--	--	--	--	1	--	1	2	1	2	--	1	1
Caterers	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	2	--	--	--	--
Cattle Dealer	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--
Caulkers	--	--	--	--	--	--	1	--	--	--	--	1	--	--	--	1	--	2	--	3	1
Chemist	--	--	--	--	--	1	--	--	--	--	--	1	--	1	--	--	1	--	--	--	--
Cigar Dealers	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	1	--	--	--	--
Makers	--	--	1	6	2	1	2	2	--	--	--	14	16	10	6	5	6	6	5	4	5
Packer	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--
Civil Engineers	--	1	--	--	2	--	1	--	--	--	--	4	--	1	1	--	3	3	1	--	--
Clergymen	--	1	1	--	4	7	8	6	--	--	--	27	26	27	15	21	24	29	18	23	21
Clerks	9	15	10	7	3	4	1	1	--	--	--	50	76	44	55	67	46	63	32	66	34
Clock Makers	--	2	2	--	1	--	--	--	--	--	--	5	10	4	--	2	3	5	1	6	--
Cloth Finishers	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	2
Coach Lace Maker	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	1	--	--	--
Coachmen	--	2	2	5	--	--	--	--	--	--	--	9	6	10	6	5	5	4	7	2	1
Coal Burner	--	--	--	--	--	--	--	--	--	--	--	--	--	2	--	--	--	--	--	--	--
Dealers	--	--	--	--	--	--	1	--	--	--	--	1	2	3	--	--	1	2	--	2	--
Collector	--	--	1	--	--	--	--	--	--	--	--	1	2	--	1	--	1	--	--	--	--
Colliers	--	--	--	--	--	--	1	--	--	--	--	1	2	--	1	--	1	3	--	1	2
Comb Maker	--	--	--	--	--	--	--	--	--	--	--	--	1	--	1	1	--	1	--	--	--
Conductors	--	--	--	--	1	1	--	--	--	--	--	2	5	1	6	1	3	1	1	2	1
Confectioners	--	--	--	--	--	--	--	--	--	--	--	--	1	2	--	2	1	--	1	1	--
Contractors	--	--	--	1	2	1	1	--	--	--	--	5	13	5	3	1	6	3	2	3	3
Convicts	--	5	2	2	1	1	1	--	--	--	--	12	--	12	--	--	--	--	--	--	--
Cooks	--	1	3	--	1	--	2	--	--	--	--	7	19	6	9	6	6	13	18	8	5
Cooper	--	--	1	1	1	1	1	1	--	--	--	6	7	4	2	3	8	5	2	2	1
Coppersmith	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--
Copper Worker	--	--	--	--	--	--	--	--	--	--	--	--	1	--	1	--	--	--	--	--	--

TABLE X—CONTINUED.

OCCUPATIONS.	15 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	80 to 90.	90 to 100.	Over 100.	Not stated.	Total, 1889.	Total, 1888.	Total, 1887.	Total, 1886.	Total, 1885.	Total, 1884.	Total, 1883.	Total, 1882.	Total, 1881.	Total, 1880.
Corset Makers	--	4	3	1	--	--	--	--	--	--	--	8	9	3	1	5	2	3	--	5	--
Cutlers	--	--	--	--	--	2	--	1	--	--	--	3	6	8	3	8	3	7	6	6	--
Cutters	--	--	--	--	--	1	--	--	--	--	--	1	3	--	4	--	--	--	--	--	--
Dentists	--	--	1	--	--	--	2	--	--	--	--	3	2	2	3	6	--	3	4	4	2
Die Sinkers	--	1	--	--	1	--	--	--	--	--	--	2	1	1	--	--	2	1	3	2	--
Distiller	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	1	1	--	--	--
Domestics	3	24	9	12	13	14	15	9	3	--	--	102	73	48	112	106	60	47	39	61	68
Draughtsmen	--	--	--	--	1	--	--	--	--	--	--	1	2	1	2	--	1	--	--	--	--
Dressmakers	1	4	5	--	4	1	--	--	--	--	--	15	29	20	19	21	19	14	12	17	10
Driver	--	--	--	--	--	--	--	--	--	--	--	--	4	1	2	--	--	--	--	--	--
Drover	--	--	--	1	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--
Druggists	--	2	4	2	--	1	1	--	--	--	--	10	14	6	6	5	5	12	2	4	3
Dyers	--	--	--	--	--	3	--	1	--	--	--	4	3	2	3	7	7	7	4	2	3
Editors	--	--	--	--	1	--	1	--	--	--	--	2	2	3	1	1	1	--	1	2	--
Electro-plater	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--
Electrician	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	1	--	--	--	--
Engineers	--	5	2	4	7	5	--	--	--	--	--	23	21	19	13	16	13	20	4	16	7
Engravers	--	--	--	--	--	--	--	--	--	--	--	--	1	1	3	1	1	1	5	2	1
Expressmen	--	1	3	2	1	--	--	--	--	--	--	7	5	2	2	9	4	2	--	8	6
Factory Girls	--	--	--	--	--	--	--	--	--	--	--	--	1	1	--	--	9	--	--	--	--
Hands	20	35	8	10	7	3	2	1	--	--	--	86	6	20	18	24	12	--	--	--	--
Farmers	28	45	36	50	86	164	240	162	20	--	--	831	770	772	712	763	694	697	768	789	678
File Cutters	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	2	--
Firemen	--	1	--	--	--	--	--	--	--	--	--	1	3	2	1	2	2	1	1	2	--
Fish Dealers	--	--	--	--	--	--	--	--	--	--	--	--	1	1	--	2	--	--	--	--	--
Fishermen	--	1	1	--	--	3	--	2	--	--	--	7	3	6	7	4	6	6	8	3	--
Flagmen	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	1	--	1	--	--	--
Florists	--	--	--	--	1	--	--	--	--	--	--	1	1	--	--	--	1	2	--	--	--
Foremen	--	--	--	--	--	--	--	--	--	--	--	--	7	--	4	3	1	8	--	3	1
Freight Clerks	--	--	--	--	--	--	--	--	--	--	--	--	2	--	--	--	--	--	--	--	--
Fur Dressers	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	1	1
Furrier	--	5	1	1	1	3	3	1	--	--	--	15	4	2	2	1	--	--	--	--	--
Galvanizers	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--
Gamblers	--	--	--	--	--	--	--	--	--	--	--	--	1	1	--	--	--	--	--	--	--
Gardeners	2	--	--	1	5	3	3	--	--	--	--	14	13	20	16	12	13	10	3	4	3
Gas Fitters	--	--	--	--	--	--	--	--	--	--	--	--	1	1	--	--	--	--	--	--	--
Makers	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	1	--	2	--
Gate Keeper	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--
Glass Cutter	--	--	--	--	--	--	--	--	--	--	--	--	1	--	2	1	1	--	--	--	--
Workers	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	2	--	--	--	3	--
Glove Cutters	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2	4	2	--
Gold Platers	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	2	--
Grinders	--	1	3	2	8	3	--	--	--	--	--	17	7	11	7	8	10	7	5	2	--
Grocers	--	--	2	2	--	2	1	--	--	--	--	7	12	4	6	3	7	6	7	3	2
Gunsmiths	--	1	--	1	--	1	--	--	--	--	--	3	4	3	4	1	--	4	--	4	2
Hackmen	--	--	--	--	--	--	--	--	--	--	--	--	--	3	2	2	1	2	--	2	1
Hair Dressers	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	1	--	--	--	--
Harness Makers	--	--	1	--	3	2	--	--	--	--	--	6	15	8	6	12	3	6	7	7	2
Hatters	9	11	9	9	5	3	2	--	--	--	--	48	53	43	27	29	18	19	28	50	45
Hat Trimmers	1	--	1	--	--	--	--	--	--	--	--	2	3	2	2	4	1	--	--	--	--
Horse Dealers	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5	1	1	--	--	--	--
Hostlers	1	7	3	1	4	2	--	--	--	--	--	18	16	5	12	5	2	4	2	4	--
Hotel Clerks	--	1	--	--	--	--	--	--	--	--	--	1	1	1	1	--	--	--	--	--	--

TABLE X—CONTINUED.

OCCUPATIONS.	15 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	80 to 90.	90 to 100.	Over 100.	Not stated.	Total, 1889.	Total, 1888.	Total, 1887.	Total, 1886.	Total, 1885.	Total, 1884.	Total, 1883.	Total, 1882.	Total, 1881.	Total, 1880.
Hotel Keepers				1	2	3						6	12	7	13	9	13	11	10	15	8
Housewives	21	156	198	197	225	290	323	252	34	3		1699	1676	1523	1608	1602	1689	1664	1614	1717	1715
Ice Dealers													1		3	1				2	1
Insurance Agents		1			3							3	13	1	4	7	5	2		5	
Inventors					1		1					2	1		6		1	2			
Iron Worker					2							2	3	2		1					
Janitors				2		1	1					4	6	5	6	1	5	1			
Japanners			1									1		3	1				3	1	
Jewelers		1		1	1			1				4	2	6	3	3	2	4	4	3	2
Journalists				1								1	1	2	1				5		
Judges															1		1				
Juggler													1								
Knife Makers						1						1		2	2	3	2				
Knitter															1						
Laborers	13	103	98	88	87	98	78	24	5			594	692	561	481	501	527	536	545	511	396
Landlords															4						
Lathers													2	1			2				
Laundrymen														1	1						
Laundresses		1	2	2	1							6	3	2			3	2	2		
Lawyers				1	2	7	2	2				14	21	21	10	9	12	15	7	10	12
Librarian															1						
Lighterman																					1
Linemen													2		1	1					
Liquor Dealers			1									1	4		2	5	3	4		4	2
Literary													1								
Liverymen		1	2	1	2		2					8	9	12	5	3	3	6	3	5	3
Locksmiths	1		1		1	1						4	8	4	2	2		8	7	8	1
Locom. Firemen		1										1									
Lumber Dealers													1	1	2	1	3				
Lumbermen														3	1	2	4	1			
Machinists	1	11	7	13	5	8	9					54	61	48	42	59	46	52	20	31	9
Mail Carriers													1	1	1			1		1	
Manufacturers			1	4	3	11	12	2				33	31	44	26	33	30	27	28	34	35
Marble Workers													1		1	1					
Mariners		5	2	7	3	7	5	4				33	20		12			27		24	38
Marketmen																1	1				
Masons		1	7	3	8	7	6	4				36	43	41	37	42	24	45		22	13
Match Maker																		1			
Mathematician				1								1									
Mechanics	7	24	17	20	23	24	13	5				133	158	138	132	160	191	195	318	325	125
Merchants		4	15	15	11	23	14	5	4			91	117	111	114	99	114	148	131	147	83
Messenger														1							
Metal Spinners														1			1				
Turners		1										1	1	1	1						
Milk Dealers					1							1		2	2	1	3	2			
Millers			1		2			2				5	5	6	6	4	7	11	5	6	5
Mill Hands	18	19	13	4	9	2	2					67	110	88	79	67	88				
Milliners		4										4	4	2	2	4	2	4	5	6	2
Millwrights							1					1	2	2	1	2	2				
Miners				1	2		1					4	3	1	5		3				
Missionary																1					
Moulders	1	10	10	9	7	2	1					40	45	40	38	29	27	41	28	24	6
Music Dealers																3	6	6		5	

TABLE X—CONTINUED.

OCCUPATIONS.	15 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	80 to 90.	90 to 100.	Over 100.	Not stated.	Total, 1889.	Total, 1888.	Total, 1887.	Total, 1886.	Total, 1885.	Total, 1884.	Total, 1883.	Total, 1882.	Total, 1881.	Total, 1880.
Musicians	--	3	1	2	1	1	--	--	--	--	--	8	5	4	4	1	--	--	--	--	--
Naval Officers	--	--	1	--	--	1	--	--	--	--	--	2	1	--	1	1	1	--	--	--	--
News Dealer	--	1	--	--	--	--	--	--	--	--	--	1	--	--	1	1	1	--	--	--	--
Nurses	--	1	1	1	4	6	3	--	1	--	--	17	13	8	15	16	18	14	13	15	2
Nurserymen	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	1	1	3	1
Opticians	--	--	1	--	--	--	--	--	--	--	--	1	--	2	--	--	3	--	--	--	--
Organ Grinders	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2	--
Organ Maker	--	1	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--
Overseers	--	--	--	--	--	--	--	--	--	--	--	--	2	5	1	2	1	1	1	2	--
Oyster Dealers	--	--	--	--	--	--	1	--	--	--	--	1	3	--	--	5	--	--	--	--	--
Oystermen	--	--	--	--	--	2	--	--	--	--	--	2	5	6	5	7	4	6	2	3	1
Oyster Openers	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2	--	--	--	--	--
Packers	--	--	--	--	--	--	--	--	--	--	--	--	1	2	3	--	2	1	1	--	--
Painters	3	11	8	11	2	6	6	2	--	--	--	49	30	52	46	53	44	40	28	39	21
Paper-box Makers	--	--	1	--	--	--	--	--	--	--	--	1	--	--	--	--	--	3	--	--	--
Paper Hangers	--	--	--	--	--	--	--	--	--	--	--	--	1	1	--	--	--	--	--	1	--
Makers	--	--	1	--	--	--	1	--	--	--	--	2	9	5	6	2	8	6	2	6	1
Sorter	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--
Pattern Makers	--	--	1	1	--	--	--	2	--	--	--	4	6	3	2	1	2	3	3	2	--
Paupers	--	--	--	--	--	--	--	--	--	--	--	--	--	4	14	11	8	6	11	6	6
Peddlers	--	--	3	3	--	1	--	3	--	--	--	10	10	10	9	11	5	10	7	3	3
Photographers	--	1	--	1	1	--	--	--	--	--	--	3	5	3	1	2	--	--	--	--	--
Physicians	--	2	5	2	2	--	7	2	--	--	--	20	23	22	27	16	21	19	16	25	24
Piano Makers	--	--	--	--	1	1	1	--	--	--	--	3	--	4	--	--	--	--	--	--	--
Tuners	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	1	--	--	--	--
Pilots	--	--	--	--	--	--	--	1	--	--	--	1	1	--	2	1	3	1	1	2	--
Pistol Makers	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2	--	1	--	--	--	--
Plane Maker	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--
Plasterers	--	--	--	--	--	--	--	--	--	--	--	--	2	1	1	--	1	--	--	--	--
Platers	--	--	--	--	2	--	--	--	--	--	--	2	1	1	1	--	--	3	1	--	--
Plumbers	1	2	3	2	--	1	--	--	--	--	--	9	12	3	7	4	8	7	5	3	1
Policemen	--	--	--	--	1	1	--	--	--	--	--	2	2	--	--	1	1	1	3	3	1
Polishers	2	7	4	1	--	1	--	--	--	--	--	15	7	8	13	3	5	8	3	11	2
Porters	--	2	--	--	1	--	--	--	--	--	--	3	5	3	2	4	1	--	--	--	--
Postmasters	--	--	--	--	--	--	--	--	--	--	--	--	2	1	1	--	--	4	2	--	1
Potters	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	2	1	--	--	--	--
Poulterer	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--
Powder Maker	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--
Pressmen	1	--	--	--	--	--	1	--	--	--	--	2	--	1	--	--	1	--	--	--	--
Priests	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2	--	1	2	--	--	--
Printers	--	5	4	--	--	--	2	2	--	--	--	13	22	14	10	14	12	--	8	10	4
Prisoners	--	--	--	--	--	--	--	--	--	--	--	--	--	--	16	10	--	--	--	--	--
Professors	--	--	--	--	--	--	--	1	--	--	--	1	1	--	--	1	3	--	--	--	--
Proof Reader	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--
Prostitute	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--
Provision Dealer	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--
Public Officers	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2	1	--	--	--
Publishers	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	3	1	--	1	1
Quarrymen	--	2	--	1	2	1	1	1	--	--	--	8	13	14	9	10	12	19	16	6	10
Quacks	--	--	--	1	--	--	--	--	--	--	--	1	--	2	--	--	--	--	--	--	--
Rag Sorters	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2	1	--	--	--	--	--
Railroad builder	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	1
Hands	--	4	1	--	2	1	--	--	--	--	--	8	9	16	5	4	4	14	7	8	10
Ticket Agents	--	--	--	--	--	--	--	--	--	--	--	--	1	1	--	--	--	--	--	--	--

TABLE X—CONTINUED.

OCCUPATIONS.	15 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	80 to 90.	90 to 100.	Over 100.	Not stated.	Total, 1889.	Total, 1888.	Total, 1887.	Total, 1886.	Total, 1885.	Total, 1884.	Total, 1883.	Total, 1882.	Total, 1881.	Total, 1880.
Real Estate Agts					1							1	4	4	1		4				
Reporters													1	3		1	1				
Restaurant Keep.					1							1	1	3	1	1	1	1		1	1
Retired Merchants													6	7	8	9	15	6	11	6	1
Riggers														1		2	2				
Rope Makers	1											1					1			2	
Rubber Workers	2	3	2			3						10	15	9	8	2	4	3			
Saddlers							1					1	1		2	3		1		4	
Sail Makers							1					1	2				2		2	4	
Salesmen		2	1	3								6	4	6	8	6	4	1		3	4
Saloon Keepers		3	8	6	2		1					20	23	15	23	18	18	19	21	19	5
Sausage Makers														1							
Saw Makers																		2			
Sea Captains							2	2				4	8	9	6	7	6	4	4	2	5
Seamen													16	29	24	34	37	21	29	16	7
Seamstresses			1		2	1		1				5	7	7	6	9	6	12	10	8	7
Secretary				1								1	1	1			1				
Sextons							1	1				2				2				1	1
Shear Makers														1	1						
Shepherd																1					
Ship Builders					1		1					2	1	1	2	2	1	5	4	2	3
Carpenters		1	1				1	1				4	2	4	7	3	3	4			
Shipping Clerks		1										1			3	2					
Shirt Cutter						1						1				1					
Manufacturers			1									1	7		2						
Shoe Dealers													1			1	1				
Makers				5	9	13	12	11				50	47	40	39	43	56	49	36	58	27
Silk Finishers																1			1	1	
Weavers					2							2									
Silver Platers		1										1	2			2	2				
Silversmith					1							1			2	2	1				
Sisters of Charity		1										1	3			2		1		1	1
Slaters			2	1								3	3								
Soap Makers															2		2				
Soda water Makers																1					
Solderers														3	1	1					
Soldiers							1					1	5	1	3	1	1	2	2		2
Spinners		1										1	6	4	2	2		6		4	1
Spoon Makers			2									2	1				1				
Spring Makers				2								2	1	2		1		2			
Stage Drivers													1	1	2	3	2	2			
Stair Builder													1								
Station Agents																1	1		1	1	1
Stampers														3			1				
Steam Fitters															2						
Stenographer		1										1									
Stevedores			1									1					1	1			
Stewards													1		1	1	1				
Stone Cutters		2	2	2	3	4	5	1				19	22	19	15	15	19	14	10	15	3
Stove Makers															1	6					
Merchants													1			1					
Straw Hatter															1						
Students	17	7				1						25	11	18	31	24	14	14	12	20	13
Superintendents						1						1		5	3	5	3	2		2	3

TABLE X—CONTINUED.

OCCUPATIONS.	15 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	80 to 90.	90 to 100.	Over 100.	Not stated.	Total, 1889.	Total, 1888.	Total, 1887.	Total, 1886.	Total, 1885.	Total, 1884.	Total, 1883.	Total, 1882.	Total, 1881.	Total, 1880.
Surveyors	--	1	--	--	--	--	--	--	--	--	--	1	--	--	2	--	1	1	--	1	--
Switchmen	--	1	1	1	1	--	--	--	--	--	--	4	3	2	--	--	1	1	1	2	1
Tack Maker	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--
Tailors	1	1	--	2	3	2	3	3	1	--	--	16	28	18	25	15	26	25	8	16	8
Tailoresses	--	--	--	--	--	--	--	--	--	--	--	--	4	2	--	1	2	5	7	4	2
Tanners	--	--	--	--	--	1	--	1	--	--	--	2	5	--	2	3	3	2	1	5	5
Tax Collectors	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	1	--	--	--
Teachers	4	7	6	5	2	1	2	1	--	--	--	28	17	30	19	32	20	18	29	28	26
Teamsters	1	6	6	3	2	1	--	--	--	--	--	19	31	22	14	14	26	21	17	22	3
Teleg. Linemen	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	1	--	--	--	--
Operators	--	--	1	--	--	--	--	--	--	--	--	1	1	2	--	--	--	--	--	--	--
Teleph. Operators	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	1	1	5	2	1	1
Thread Packer	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--
Tile Cutter	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--
Time Keeper	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--
Tinsmith	--	1	--	1	2	1	1	1	--	--	--	7	8	4	1	3	10	6	7	11	10
Tobacconists	--	--	1	--	--	--	--	--	--	--	--	1	1	1	1	1	1	--	--	--	--
Tool Makers	--	2	1	2	1	--	--	--	--	--	--	6	3	1	1	2	3	4	2	2	--
Town Clerks	--	--	--	--	--	--	--	--	--	--	--	--	1	2	--	--	--	--	--	--	--
Trader	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--
Track Master	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--
Tramps	--	--	1	--	--	--	--	--	--	--	--	1	--	3	--	3	--	--	2	3	--
Trav. Salesmen	--	--	--	--	--	--	--	--	--	--	--	--	9	4	3	6	6	4	4	5	--
Treasurers	--	--	--	--	--	--	--	--	1	--	--	1	--	1	1	--	1	--	--	--	--
Trimmers	--	1	--	--	--	--	--	--	--	--	--	1	1	--	--	--	--	4	--	--	--
Trunk Maker	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--
Tuners	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	2	--	--
Turners	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	1	--	--	--	5	4
Type Maker	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	1	--	--	--
Umbrella Mender	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--
Undertakers	--	2	1	--	1	2	--	--	--	--	--	6	--	3	3	4	4	3	--	3	2
Upholsterers	--	1	--	--	--	1	--	--	--	--	--	2	1	2	--	2	2	--	1	1	1
Varnishers	--	--	--	--	1	--	--	--	--	--	--	1	3	--	3	1	--	--	--	--	--
Venders	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	1	1	--	--	--	--
Veterinary Surg.	--	--	--	--	--	--	--	--	--	--	--	--	2	4	2	1	--	--	--	--	--
Wagon Makers	--	--	--	1	--	1	2	--	--	--	--	4	3	3	1	3	--	--	--	--	--
Waiters	2	3	2	2	1	--	--	--	--	--	--	10	7	7	4	5	6	9	--	6	--
Warden St. Pris.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--
Watchmen	--	--	1	--	1	2	2	--	--	--	--	6	9	13	6	8	8	7	--	6	2
Watchmakers	--	--	--	1	--	--	--	--	--	--	--	1	2	2	3	1	--	--	--	--	--
Weavers	--	6	3	2	4	2	1	1	--	--	--	19	18	16	23	21	24	29	18	24	3
Well Digger	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--
Whalers	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	1
Wheelwrights	--	--	1	--	2	3	--	--	--	--	--	6	3	5	6	4	2	3	2	2	--
Whitewashers	--	--	--	--	--	--	--	--	--	--	--	--	2	--	--	1	--	1	--	--	--
Wire Workers	--	--	1	--	1	1	--	--	--	--	--	3	4	2	3	3	3	5	1	3	--
Wood Choppers	--	--	--	--	--	--	--	--	--	--	--	--	1	--	1	1	--	--	--	--	--
Turners	--	--	--	--	--	--	--	--	--	--	--	--	2	2	3	1	1	--	6	--	--
Carvers	--	--	--	--	1	--	--	--	--	--	--	1	5	--	--	--	--	--	--	--	--
Wool Carders	--	--	--	--	1	--	--	--	--	--	--	1	--	1	1	--	--	--	--	2	1
Sorters	--	--	--	--	--	1	--	--	--	--	--	1	--	--	1	--	2	2	3	--	--
Weavers	--	1	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--

TABLE XI.

VITAL STATISTICS OF THE COLORED POPULATION BY COUNTIES.

COUNTIES.	Estimated Population.	BIRTHS.														MARRIAGES.											DEATHS.												
		Male.	Female.	Sex not stated.	Total, 1889.	1888.	1887.	1886.	1885.	1884.	1883.	1882.	1881.	1880.	Average.	1889.	1888.	1887.	1886.	1885.	1884.	1883.	1882.	1881.	1880.	Average.	Male.	Female.	Sex not stated.	Total, 1889.	1888.	1887.	1886.	1885.	1884.	1883.	1882.	1881.	1880.	Average.
Hartford	144,100	38	29	1	68	60	61	62	57	52	47	73	65	55	60.0	29	24	26	32	28	12	12	18	16	3	20.0	31	34	1	66	51	55	50	62	58	56	59	64	56	57.7
New Haven	204,960	53	55	7	115	104	80	98	75	111	92	88	72	74	90.9	38	41	24	51	36	43	52	42	5	4	33.6	57	57	..	114	111	80	117	67	101	110	83	104	65	95.2
New London	76,210	19	13	..	32	33	35	26	32	31	40	38	30	32	32.9	14	12	13	20	22	8	15	11	16	6	13.7	24	12	..	36	35	29	28	30	48	47	39	35	37	36.4
Fairfield	146,960	30	28	..	58	50	43	55	41	46	55	39	39	60	48.6	16	26	26	18	18	16	18	12	15	3	16.8	28	38	..	66	56	74	66	52	53	41	45	52	53	55.8
Windham	45,000	6	6	..	12	11	13	14	10	9	9	7	13	7	10.5	9	4	3	4	4	..	6	3	12	2	4.7	7	3	2	12	12	9	10	14	19	11	...	9	7	10.3
Litchfield	53,130	12	10	1	23	9	21	15	21	15	18	23	23	17	18.5	7	5	5	5	8	4	8	4	4	4	5.4	10	5	1	16	20	28	15	13	9	16	16	17	18	16.8
Middlesex	38,600	3	5	2	10	8	9	4	10	12	8	6	7	4	7.8	3	4	1	3	...	2	4	5	1	3	2.6	1	3	..	4	15	11	7	6	12	12	6	6	8	8.7
Tolland	25,040	2	2	..	4	8	2	6	4	4	3	9	6	5	5.1	...	...	2	6	2	..	2	3	1	2	1.8	1	...	..	1	6	...	1	3	6	3	6	1	7	3.4
Total	734,000	163	148	11	322	283	264	280	250	280	272	283	255	254	274.3	116	116	100	139	118	85	117	98	70	27	98.6	159	152	4	315	306	286	294	247	306	296	254	288	251	284.3

NOTE.—In addition to the above there were in 1889 six (6) mixed marriages, in 1888 eight (8) mixed marriages in 1887 three (3) mixed marriages, in 1885 six (6) mixed marriages.

TABLE III.

DEATHS FROM MALARIAL* FEVERS IN EACH TOWN, BY COUNTIES, CONTRASTED WITH THOSE FROM TYPHOID FEVER FOR A SERIES OF YEARS.

HARTFORD COUNTY.

TOWNS.	Estimated Population.	1889.		1888.		1887.		1886.		1885.		1884.		1883.		1882.		1881.		1880.		1879.		1878.		1877.		Typhoid Fever				
		Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	1876.	1875.	1874.	1873.	1872.
Hartford	51,500	3	26	4	26	2	8	7	21	9	21	---	28	3	12	4	30	12	27	24	13	3	11	2	22	---	22	26	35	14	29	33
Avon	1,170	---	---	---	---	---	---	---	1	---	1	---	---	---	1	---	1	---	---	---	---	---	1	---	1	---	1	---	1	3	1	5
Berlin	2,580	3	1	2	---	1	---	---	2	---	---	4	---	2	---	---	---	---	---	---	---	1	1	---	---	---	1	---	2	---	1	4
Bloomfield	1,300	---	---	---	---	---	---	---	---	---	1	---	---	---	---	---	2	1	---	---	---	---	1	---	---	---	---	2	1	3	3	2
Bristol	7,200	---	4	1	4	---	4	---	---	---	1	---	4	---	3	1	7	---	7	2	4	---	1	1	3	---	4	15	4	9	6	8
Burlington	1,290	---	---	---	---	---	1	---	1	---	1	1	2	---	2	---	2	1	---	---	---	---	---	---	2	---	---	2	---	---	3	1
Canton	2,500	---	2	---	1	---	1	---	4	---	4	---	2	---	---	---	7	---	---	---	---	---	8	---	---	---	4	---	1	2	1	2
East Granby	660	---	---	---	---	---	---	---	1	---	---	---	---	---	---	---	---	2	---	---	---	---	---	---	---	---	1	---	---	1	---	---
East Hartford	4,200	---	1	2	1	2	4	---	1	1	---	---	1	1	2	3	3	2	---	5	---	2	3	---	4	4	1	3	1	2	2	2
East Windsor	2,900	---	---	---	---	2	---	---	---	---	1	---	---	---	3	1	2	---	1	---	1	---	---	---	1	---	1	---	1	3	4	1
Enfield	7,000	---	5	---	3	2	---	1	3	3	5	---	4	---	1	1	---	2	---	---	4	---	---	---	1	---	2	5	2	2	3	5
Farmington	3,160	---	2	1	---	1	---	---	---	---	1	---	5	---	4	1	---	---	---	---	---	---	---	---	2	---	2	3	5	---	---	1
Glastonbury	3,460	---	---	1	5	1	1	1	---	1	7	---	1	1	---	1	---	---	2	---	1	---	---	1	---	---	1	3	4	4	12	3
Granby	1,250	---	---	---	---	---	1	---	1	---	1	---	---	1	1	1	---	---	---	1	---	1	---	---	---	---	1	2	2	3	2	2
Hartland	570	---	---	---	1	---	---	---	---	---	---	---	---	1	---	---	---	1	1	---	---	---	---	---	---	---	---	---	---	1	---	2
Manchester	8,100	---	1	2	1	7	1	3	---	5	---	10	2	1	4	---	2	---	6	1	5	1	1	---	---	1	1	2	1	6	3	5
Marlborough	570	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2	---	---	---	---	---	---	---	1	---	1	1
New Britain	18,600	1	10	1	15	---	8	---	7	---	4	---	5	---	7	3	1	---	4	4	1	6	1	2	2	---	7	8	16	7	7	18
Newington	950	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Plainville	1,990	1	---	---	2	---	---	---	1	2	3	---	---	---	---	---	---	---	---	---	---	1	---	---	---	---	2	1	1	1	2	1
Rocky Hill	1,070	---	---	---	---	---	---	---	1	---	4	---	2	1	1	---	---	---	---	1	---	---	---	1	---	---	---	1	---	---	1	5
Simsbury	1,860	1	---	---	1	---	---	---	2	---	1	---	1	---	1	---	1	1	1	---	---	---	1	1	1	---	1	2	3	---	1	2
Southington	5,490	5	1	1	3	3	1	---	---	4	3	1	---	1	2	---	---	2	---	1	3	2	---	---	---	---	1	3	12	1	3	8
South Windsor	1,740	---	1	---	2	---	---	---	1	---	1	---	---	1	---	---	---	---	1	---	2	---	---	---	---	---	---	2	3	---	1	1
Suffield	3,170	---	2	---	2	---	1	---	1	---	3	---	1	---	4	1	3	---	---	3	2	---	---	---	---	1	5	---	3	1	6	5
West Hartford	1,910	---	---	---	---	---	---	---	1	---	2	---	---	1	---	---	2	---	1	---	---	---	---	1	---	---	1	---	2	2	2	---
Wethersfield	2,260	1	---	---	5	1	2	---	---	---	---	1	---	---	---	---	1	---	1	---	1	3	1	3	---	---	1	2	---	1	4	6
Windsor	2,950	---	3	---	2	---	---	---	1	---	1	---	1	---	---	---	---	1	---	---	1	---	---	---	---	---	3	1	1	1	3	1
Windsor Locks	2,700	---	3	1	1	---	---	---	---	---	---	1	2	---	1	2	---	---	---	---	---	1	---	1	---	---	---	5	1	1	1	---

* Malarial is used for all the varieties—Intermittent, Congestive, Remittent, etc., except Typho-Malarial.

TABLE XII—CONTINUED. NEW HAVEN COUNTY.

TOWNS.	Estimated Population.	1889.		1888.		1887.		1886.		1885.		1884.		1883.		1882.		1881.		1880.		1879.		1878.		1877.		Typhoid Fever				
		Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	1876.	1875.	1874.	1873.	1872.
New Haven	84,500	17	24	22	38	13	24	8	25	13	17	10	42	28	33	20	24	30	28	13	18	6	12	5	13	1	15	23	37	47	55	53
Ansonia	10,250	---	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Beacon Falls	500	---	---	---	---	---	---	---	---	---	---	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2	2	1
Bethany	550	---	---	---	---	---	1	---	---	---	---	---	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1	1	1	2
Branford	4,300	---	1	3	1	---	---	---	1	1	---	1	2	---	5	---	---	---	1	---	4	2	---	1	1	---	2	3	5	1	1	3
Cheshire	1,900	---	1	---	---	---	---	---	1	---	---	---	---	1	1	---	---	---	1	---	---	---	---	---	---	1	1	2	---	3	2	2
Derby	5,900	1	1	3	7	---	7	1	4	3	4	---	7	2	5	2	7	1	2	1	1	---	1	1	1	1	2	3	4	4	3	7
East Haven	950	1	---	---	---	---	---	1	---	---	---	---	---	---	---	---	2	3	---	---	---	2	---	---	1	---	2	2	1	1	---	3
Guilford	2,780	1	---	---	4	---	---	---	---	---	1	---	1	---	1	---	---	---	1	---	---	1	1	1	3	---	1	1	---	3	1	2
Hamden	3,820	---	1	1	3	3	1	1	1	2	---	1	---	2	---	1	2	1	2	1	---	---	---	1	1	3	---	---	---	---	2	2
Madison	1,430	---	---	---	11	---	1	---	1	---	3	---	2	---	1	---	---	---	1	---	2	---	---	---	---	---	---	---	1	---	3	1
Meriden	25,000	7	7	7	---	5	5	3	6	6	9	6	9	8	8	7	9	1	14	2	5	2	5	4	8	2	9	5	21	4	12	11
Middlebury	580	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2	---	2	1	1	---	---	---	1	2	---	1	1	---
Milford	3,800	1	1	---	2	---	---	---	1	1	---	1	1	---	1	1	---	---	2	2	1	---	---	1	---	---	---	3	---	5	3	---
Naugatuck	6,000	---	5	---	8	1	---	1	1	---	4	---	1	---	5	---	14	---	---	---	3	---	---	---	4	---	7	---	4	4	3	6
North Branford	850	1	---	---	---	1	---	2	---	1	1	1	---	1	1	---	---	1	---	---	---	---	---	1	---	1	1	---	4	---	1	1
North Haven	1,860	---	1	2	---	---	1	---	1	1	---	---	1	---	1	1	---	4	---	---	1	2	---	2	---	1	---	---	2	4	---	---
Orange	4,500	---	1	1	2	---	---	1	3	1	---	---	---	---	---	---	1	---	2	1	---	---	3	---	---	1	---	---	3	---	1	---
Oxford	900	---	1	---	---	---	---	---	1	---	---	---	---	---	---	---	1	---	---	2	---	---	1	---	---	---	---	2	---	1	---	2
Prospect	450	---	---	1	---	---	---	---	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1	---	---	1	---	---
Seymour	3,200	---	2	---	3	---	---	1	---	1	---	---	---	---	1	1	1	5	2	---	3	---	---	---	4	---	---	---	2	---	---	3
Southbury	1,100	---	---	---	---	---	---	---	---	---	---	---	---	---	2	---	1	---	---	2	---	---	1	1	---	---	1	3	---	---	1	2
Wallingford	6,400	4	2	1	2	3	1	---	1	1	4	---	5	1	2	2	3	1	4	2	2	---	1	1	1	---	1	4	1	---	6	11
Waterbury	32,000	1	11	5	13	1	8	---	19	1	13	7	20	4	41	2	13	---	8	---	5	1	---	---	14	---	17	16	17	18	11	12
Wolcott	520	---	1	---	1	---	1	---	2	---	---	---	---	---	---	---	---	---	1	---	---	---	---	---	---	---	3	1	3	---	---	3
Woodbridge	920	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1	---	---	---	---	---	---	---	1	---	1	1	---	2	1	2

TABLE XII—CONTINUED. NEW LONDON COUNTY.

TOWNS.	Estimated Population.	1889.		1888.		1887.		1886.		1885.		1884.		1883.		1882.		1881.		1880.		1879.		1878.		1877.		Typhoid Fever				
		Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	1876.	1875.	1874.	1873.	1872.
New London	13,500	2	6	2	3	1	3	5	1	5	1	5	---	---	2	1	3	1	5	---	4	---	4	---	6	---	2	3	7	6	3	6
Bozrah	1,000	---	2	---	---	---	---	---	---	---	---	---	---	---	1	---	1	---	---	---	---	---	1	---	---	---	---	1	--	--	.	2
Colchester	2,990	---	1	---	3	1	1	---	---	---	---	---	1	---	4	---	5	---	3	---	1	---	2	---	2	---	1	1	1	2	2	4
East Lyme	2,000	---	1	1	1	1	---	---	---	---	2	---	1	---	---	1	---	1	---	2	2	---	3	---	2	---	---	2	1	1	--	1
Franklin	590	---	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1	---	---	---	---	---	---	--	3	--	--	1
Griswold	3,110	1	1	1	1	---	---	---	1	2	1	---	1	2	1	---	3	1	3	---	3	---	---	---	--	---	2	3	3	4	1	--
Groton	5,470	---	1	1	2	1	2	---	1	2	---	---	---	---	---	1	4	---	---	---	5	---	5	---	1	---	3	6	1	3	4	5
Lebanon	1,680	---	---	1	---	---	---	1	---	---	---	---	---	---	---	1	---	---	2	---	---	---	1	---	---	---	1	1	1	2	1	3
Ledyard	1,200	1	1	---	---	---	---	---	1	---	---	---	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	--	2	1	2	1
Lisbon	550	---	---	---	---	---	---	---	---	---	---	---	1	---	---	---	---	2	1	---	---	---	---	---	---	---	---	1	--	--	--	--
Lyme	980	---	---	---	---	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	--	3	2	--	
Montville	2,350	---	---	---	1	1	---	---	1	---	---	---	---	---	---	---	---	---	---	---	2	---	1	---	1	---	---	--	4	3	--	1
Norwich	22,900	3	8	---	1	2	3	---	5	2	23	---	12	---	12	1	12	1	6	1	7	1	5	---	12	---	12	14	11	12	16	12
North Stonington	1,460	---	1	1	---	---	---	---	1	---	---	---	1	---	2	---	---	---	2	---	1	---	---	---	1	---	1	1	4	--	--	--
Old Lyme	1,320	---	1	---	---	2	1	---	---	---	---	---	1	2	---	---	---	---	---	---	---	---	---	1	1	---	1	2	1	3	1	1
Preston	2,550	---	---	---	---	---	1	---	---	---	---	---	2	1	1	---	1	1	---	---	---	---	1	---	---	---	---	--	--	1	--	--
Salem	490	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2	---	---	---	---	---	1	---	---	---	---	--	--	--	--	--
Sprague	1,000	---	---	---	---	---	1	---	1	---	---	---	1	---	---	---	1	---	1	---	---	---	6	---	---	---	1	4	3	4	--	--
Stonington	7,350	---	---	---	3	---	2	---	1	---	---	1	1	---	2	2	3	---	---	1	5	1	5	---	3	---	1	3	--	3	4	1
Voluntown	1,060	---	---	---	1	---	---	---	1	--	1	1	1	---	---	---	---	---	---	---	1	---	---	---	---	---	---	1	--	2	3	--
Waterford	2,660	---	2	1	---	3	1	---	1	---	---	1	---	---	---	---	---	1	---	---	---	---	---	---	---	---	1	--	--	1	--	2

TABLE XII—CONTINUED. FAIRFIELD COUNTY.

TOWNS.	Estimated Population.	1889.		1888.		1887.		1886.		1885.		1884.		1883.		1882.		1881.		1880.		1879.		1878.		1877.		Typhoid Fever				
		Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	1876.	1875.	1874.	1873.	1872.
Danbury	18,900	---	22	3	8	1	7	---	10	1	1	---	4	---	3	---	3	---	3	1	4	---	1	---	2	---	4	5	3	--	2	5
Bridgeport	47,800	22	8	11	8	8	17	2	---	9	12	5	11	5	2	3	9	5	13	4	10	4	11	4	9	5	7	5	10	6	16	27
Bethel	3,350	1	1	---	2	---	---	---	3	--	1	---	---	---	1	1	---	---	1	2	1	---	---	---	1	---	---	2	--	1	--	--
Brookfield	1,000	---	---	---	1	---	---	---	---	---	---	---	---	---	3	---	---	---	1	---	---	---	---	---	---	---	---	1	1	--	--	--
Darien	2,250	---	---	2	---	---	---	---	---	---	---	---	---	---	---	1	---	---	---	---	4	1	---	1	---	---	1	1	--	3	1	--
Easton	1,000	3	---	1	---	1	---	---	---	1	1	---	---	---	---	1	---	---	---	---	---	---	---	---	---	1	2	1	--	--	--	3
Fairfield	3,860	1	---	---	---	1	---	---	2	1	2	---	1	5	---	1	2	2	---	---	---	4	---	1	---	---	3	3	2	5	1	2
Greenwich	10,000	1	3	3	4	3	1	2	2	2	4	---	1	2	3	---	1	1	---	2	---	1	3	3	2	---	1	--	1	--	1	1
Huntington	3,850	2	2	---	1	1	1	---	2	---	1	---	---	---	2	---	---	---	1	---	2	---	---	---	1	1	1	3	--	5	1	--
Monroe	1,000	---	---	---	---	1	---	---	---	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1	--	2	1	1
New Canaan	2,690	---	1	---	---	1	---	---	---	---	---	---	2	1	3	---	---	---	3	---	3	3	1	---	1	---	---	1	--	1	--	2
New Fairfield	680	---	---	---	---	---	---	---	---	2	---	---	1	---	---	---	---	---	---	---	---	---	---	---	---	---	1	---	---	---	---	---
Newtown	3,500	2	2	1	---	1	---	1	---	2	1	---	---	---	---	---	4	---	2	1	1	---	3	---	1	---	---	---	---	---	1	6
Norwalk	17,400	4	4	12	2	10	2	4	2	10	3	3	2	3	2	4	6	9	4	2	1	1	1	1	5	2	6	8	11	2	5	7
Redding	1,540	---	2	1	---	---	---	---	1	1	---	---	2	---	---	---	---	---	---	---	---	---	---	---	---	---	1	---	---	---	2	--
Ridgefield	2,200	---	---	---	---	---	1	---	---	---	---	---	1	---	---	---	---	---	1	---	---	---	---	---	---	---	---	---	---	---	---	2
Sherman	680	---	1	---	---	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2	---	---	---	---	---	2	--	1	--	2
Stamford	15,000	---	8	4	1	3	2	3	2	3	3	2	---	2	6	4	10	3	1	3	1	2	4	---	2	2	2	1	3	--	1	--
Stratford	2,600	1	2	1	2	1	3	---	3	---	1	---	1	1	1	---	---	---	3	---	---	---	---	1	---	---	1	--	--	--	2	2
Trumbull	1,450	---	1	---	---	---	---	---	---	---	---	1	---	---	---	---	---	---	---	1	2	---	---	---	---	---	1	2	2	1	2	--
Weston	780	---	---	---	1	---	1	---	---	---	---	---	1	---	---	---	---	1	---	---	---	---	1	---	---	---	---	1	--	--	1	3
Westport	3,700	1	9	1	---	3	1	2	2	1	---	---	1	1	1	1	---	1	---	2	3	1	---	---	---	2	1	4	6	1	3	5
Wilton	1,730	---	2	---	1	1	1	---	1	---	1	---	2	---	2	---	---	---	---	---	---	---	1	---	2	1	---	---	--	1	1	1

TABLE XII—CONTINUED. WINDHAM COUNTY.

TOWNS.	Estimated Population.	1889.		1888.		1887.		1886.		1885.		1884.		1883.		1882.		1881.		1880.		1879.		1878.		1877.		Typhoid Fever				
		Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	1876.	1875.	1874.	1873.	1872.
Brooklyn	3,600	---	1	1	2	---	1	---	1	---	1	---	2	---	2	---	3	---	1	4	2	---	---	---	2	---	---	1	4	1	--	--
Ashford	790	---	1	---	---	---	3	---	---	---	---	---	---	---	---	---	---	---	2	---	1	---	---	---	---	---	1	1	4	4	2	1
Canterbury	960	---	---	1	---	1	1	---	---	---	1	---	---	---	2	---	4	---	---	---	---	---	1	---	---	---	---	1	1	--	--	1
Chaplin	550	---	1	---	---	---	---	---	---	---	---	---	---	---	---	---	1	---	---	---	---	---	---	---	1	---	1	--	--	--	1	--
Eastford	580	1	---	---	---	---	---	---	---	---	---	---	---	---	---	1	1	---	---	---	1	---	---	---	---	---	1	--	--	4	1	--
Hampton	650	---	1	---	---	---	1	---	---	---	---	---	---	---	2	---	---	---	---	---	---	---	---	---	---	---	---	--	--	--	1	1
Killingly	7,030	---	4	1	8	---	4	---	17	---	6	---	6	---	5	---	13	---	7	---	13	---	2	---	7	---	6	4	1	5	8	13
Plainfield	4,570	---	1	1	5	4	---	---	1	3	1	---	3	---	1	1	6	---	7	---	3	---	3	---	---	---	---	5	3	8	2	3
Pomfret	1,490	---	1	---	---	---	1	---	---	---	1	---	---	---	---	---	1	---	2	---	2	---	1	---	---	---	2	1	2	1	--	--
Putnam	6,440	---	2	---	4	1	4	---	4	---	---	2	6	---	3	---	2	---	---	---	7	---	2	---	13	---	9	7	6	10	10	10
Scotland	500	---	---	---	1	---	---	---	---	---	---	---	---	---	---	---	1	---	---	---	---	---	---	---	---	---	---	--	--	--	--	--
Sterling	1,040	---	3	---	---	---	1	---	---	---	---	---	---	1	---	---	1	---	---	---	---	---	---	---	---	---	---	4	3	--	--	1
Thompson	5,600	---	4	2	3	---	1	---	---	---	---	3	1	---	---	---	---	---	---	---	---	---	4	---	1	---	2	6	6	2	1	--
Windham	9,900	---	1	3	5	---	2	3	6	2	8	1	7	1	13	1	4	---	7	1	3	---	3	---	3	---	4	1	2	1	--	2
Woodstock	2,300	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1	---	2	---	1	---	---	---	1	2	4	1	2	7

TABLE XII—CONTINUED. LITCHFIELD COUNTY.

TOWNS.	Estimated Population.	1889.		1888.		1887.		1886.		1885.		1884.		1883.		1882.		1881.		1880.		1879.		1878.		1877.		Typhoid Fever				
		Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	1876.	1875.	1874.	1873.	1872.
Litchfield	3,300	---	---	---	---	1	---	---	1	---	1	1	---	1	---	---	2	---	---	---	---	---	---	---	6	---	3	3	2	1	4	--
Barkhamsted	1,130	---	---	---	---	---	1	---	---	---	---	---	---	---	1	---	1	---	---	---	---	---	---	---	---	---	---	1	2	2	--	1
Bethlehem	540	---	---	---	---	---	---	---	1	---	---	---	1	---	---	---	---	---	---	---	---	1	---	---	---	---	---	--	2	--	--	2
Bridgewater	620	---	---	---	---	---	---	---	1	---	1	---	1	---	---	---	---	---	---	1	3	---	---	---	---	---	---	--	1	3	2	2
Canaan	970	---	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1	---	---	---	---	---	2	--	1	--	3
Colebrook	1,100	---	---	---	---	---	1	---	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1	2	--	--	1	2
Cornwall	1,280	---	1	---	---	---	---	---	---	---	2	---	---	---	1	---	2	---	---	---	---	---	---	---	---	---	1	1	8	2	--	3
Goshen	980	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1	---	1	---	---	---	---	---	2	---	---	---	---	--	1	--
Harwinton	940	---	1	---	---	---	---	---	2	---	---	---	1	---	2	---	---	---	---	---	---	---	---	---	---	---	---	--	3	1	2	2
Kent	1,380	2	---	---	---	---	---	---	---	---	1	1	---	---	1	---	1	---	1	3	1	2	---	---	1	---	1	3	2	--	2	--
Morris	590	---	---	---	---	---	---	---	---	---	---	---	1	---	---	---	1	---	---	---	---	---	---	---	---	---	1	--	--	--	3	--
New Hartford	3,160	---	1	---	4	---	2	---	2	---	1	---	2	---	1	---	2	---	1	1	1	---	1	1	1	---	3	1	--	--	2	3
New Milford	3,930	---	2	---	3	3	1	1	3	2	2	4	1	1	2	1	4	---	2	1	5	2	4	---	2	---	4	3	1	6	3	3
Norfolk	1,530	---	1	---	1	---	---	---	---	---	1	---	---	---	---	---	1	---	1	---	---	---	---	---	---	---	1	2	2	2	1	1
North Canaan	1,650	---	4	---	3	---	---	---	1	1	---	---	---	---	---	---	---	1	3	---	1	1	---	---	---	---	---	--	2	2	--	1
Plymouth	2,150	---	1	---	---	---	1	---	1	---	1	---	1	---	---	---	2	---	---	---	1	---	1	---	2	---	---	3	--	1	6	6
Roxbury	930	---	---	---	1	---	---	---	---	---	---	---	1	---	1	---	---	---	1	---	---	---	---	---	1	---	---	1	--	2	1	1
Salisbury	3,430	1	1	---	---	---	---	---	---	1	---	---	1	---	3	---	3	---	3	---	3	1	2	1	1	---	---	3	2	--	2	--
Sharon	2,150	---	2	---	---	---	---	---	---	---	2	---	---	---	---	---	1	---	---	---	2	---	1	---	4	---	5	2	1	3	4	--
Thomaston	3,270	---	1	1	4	---	---	---	---	---	---	1	---	2	1	1	1	---	---	---	---	---	1	---	---	---	2	1	--	--	--	--
Torrington	5,800	---	3	---	1	---	6	---	---	---	1	---	---	4	1	---	3	1	2	---	---	2	2	---	3	---	1	4	6	3	3	4
Warren	490	---	1	---	2	---	---	---	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	--	--	4	--	3
Washington	1,630	---	---	---	1	---	1	---	2	2	3	---	---	---	---	---	1	---	---	---	---	---	---	---	---	---	---	1	--	2	--	1
Watertown	2,300	1	---	---	1	---	---	---	1	1	1	---	1	---	1	---	1	---	---	---	---	---	---	---	---	---	---	--	1	--	--	2
Winchester	6,060	---	---	---	---	---	1	---	2	---	2	---	---	1	---	---	2	---	---	---	---	3	1	3	1	---	1	1	4	3	--	--
Woodbury	1,820	---	1	---	---	---	---	---	1	---	---	---	---	---	3	---	---	---	---	---	1	1	---	---	3	---	---	--	--	2	2	4

TABLE XII—CONTINUED. MIDDLESEX COUNTY.

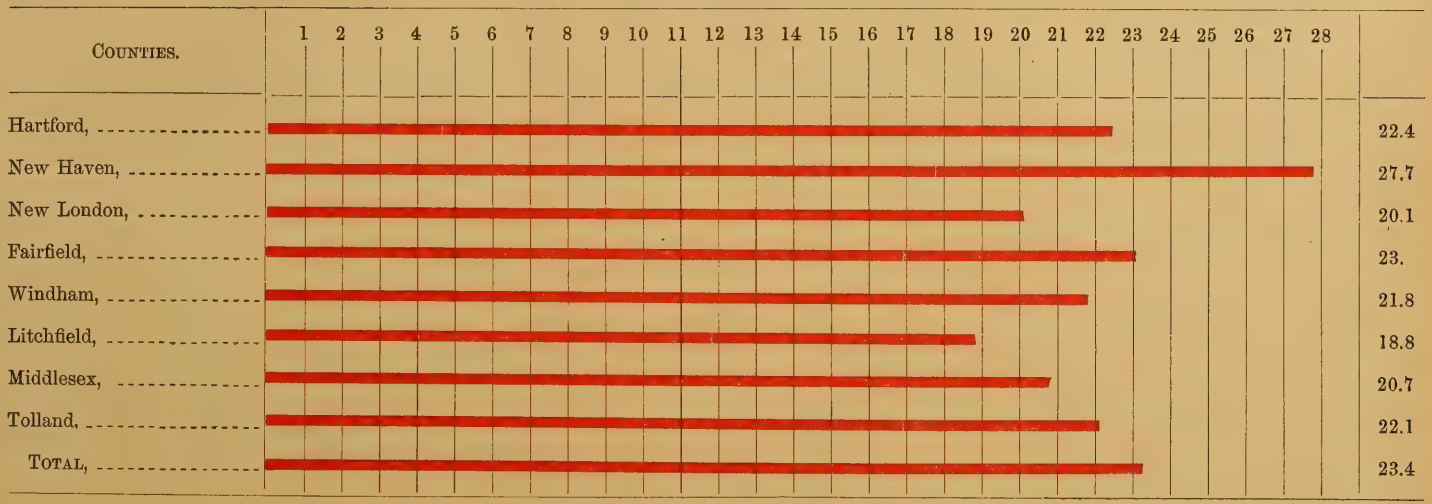
TOWNS.	Estimated Population.	1889.		1888.		1887.		1886.		1885.		1884.		1883.		1882.		1881.		1880.		1879.		1878.		1877.		Typhoid Fever				
		Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	1876.	1875.	1874.	1873.	1872.
Middletown	14,600	2	---	1	4	2	1	2	1	4	---	2	6	3	2	3	2	8	5	4	6	---	2	2	1	---	3	4	8	7	5	13
Haddam	2,070	2	1	2	3	1	4	---	1	---	---	---	---	---	---	1	1	---	6	---	2	1	---	1	---	---	1	---	3	---	2	1
Chatham	1,950	---	---	---	---	---	---	---	3	---	2	---	1	---	1	1	1	---	1	---	2	---	1	---	2	---	---	---	1	2	3	4
Chester	1,280	---	1	---	---	---	---	---	---	---	---	---	1	1	---	2	1	---	---	---	---	---	---	1	---	---	---	---	2	1	1	2
Clinton	1,390	1	---	---	1	2	---	1	1	---	1	---	---	1	2	---	---	1	---	---	2	---	---	---	---	---	1	3	1	3	3	---
Cromwell	1,860	---	1	---	---	---	1	---	2	---	---	---	1	---	---	---	---	1	---	---	1	---	---	1	3	---	---	---	2	1	1	2
Durham	860	---	1	---	1	1	1	---	1	---	2	2	1	---	2	---	2	1	---	---	1	---	---	---	2	---	---	---	---	---	---	---
East Haddam	2,550	---	---	5	---	1	---	---	---	3	---	---	1	2	---	1	2	1	1	1	2	1	---	1	3	---	3	---	6	3	5	3
Essex	2,020	---	---	---	---	---	---	---	---	---	1	---	1	1	---	---	3	---	1	-	---	---	---	1	1	---	---	1	2	2	---	---
Killingworth	600	---	---	---	---	---	---	---	---	---	---	---	---	---	3	1	1	1	---	---	---	---	1	2	---	---	2	---	---	---	1	2
Middlefield	990	---	---	---	1	---	---	---	---	---	---	---	---	1	---	---	1	1	---	---	---	---	---	---	---	---	---	---	---	1	---	---
Old Saybrook	1,460	---	---	---	---	---	---	---	---	---	1	---	---	---	---	1	1	3	1	---	1	1	---	2	---	---	2	1	1	3	---	2
Portland	4,630	1	2	3	5	4	5	---	4	8	1	---	3	1	2	1	6	3	---	1	2	1	---	---	4	---	3	2	3	5	3	5
Saybrook	1,470	1	---	---	---	---	---	---	---	---	---	---	---	2	1	2	1	---	-	3	1	---	---	1	1	---	---	2	1	1	---	---
Westbrook	870	---	---	1	---	---	---	---	---	---	---	---	1	---	1	---	2	---	3	---	---	---	1	---	2	---	---	---	---	---	---	---

TABLE XII—CONTINUED. TOLLAND COUNTY.

TOWNS.	Estimated Population.	1889.		1888.		1887.		1886.		1885.		1884.		1883.		1882.		1881.		1880.		1879.		1878.		1877.		Typhoid Fever				
		Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	Malarial.	Typhoid.	1876.	1875.	1874.	1873.	1872.
Tolland	1,050	---	1	---	---	---	2	---	---	---	1	---	---	---	1	1	2	---	1	---	---	---	---	---	---	---	---	1	--	2	1	--
Andover	400	---	2	---	---	---	---	---	---	---	---	---	1	---	---	---	1	---	1	1	---	---	---	---	1	---	---	1	--	--	1	2
Bolton	460	---	---	---	1	---	---	---	---	---	---	---	1	1	---	---	1	---	---	---	---	---	---	---	1	---	1	1	1	1	--	--
Columbia	740	1	---	---	---	---	---	---	--	---	---	---	---	---	---	---	---	---	1	---	---	---	---	---	---	---	---	--	1	1	--	1
Coventry	1,890	---	2	---	---	---	1	---	1	---	---	---	2	---	3	--	3	---	---	---	2	---	---	---	---	---	1	3	3	6	--	--
Ellington	1,520	---	---	---	1	---	---	---	1	---	---	---	---	---	---	---	---	---	2	---	---	---	---	---	1	---	---	--	--	--	1	--
Hebron	1,050	---	---	2	1	---	---	---	1	---	---	1	---	---	1	---	1	---	1	---	1	---	1	---	---	---	---	1	--	1	--	1
Mansfield	1,950	---	---	---	1	---	1	---	1	---	2	---	2	---	2	---	2	---	---	---	3	---	1	---	---	---	2	2	5	2	4	4
Somers	1,400	---	---	---	1	---	---	---	---	---	---	---	---	---	1	1	2	---	---	---	---	---	---	---	1	---	---	--	2	--	--	3
Stafford	4,520	---	4	---	1	---	2	---	---	---	1	---	7	---	4	---	7	---	3	1	3	---	2	---	1	---	3	3	--	--	--	2
Union	440	1	---	---	---	---	---	---	6	---	1	---	---	2	1	---	---	---	1	---	---	---	2	---	1	---	1	1	1	1	1	2
Vernon	8,700	1	5	---	3	---	7	---	---	---	2	---	3	1	7	---	5	---	5	---	6	1	4	---	7	---	10	5	12	8	11	9
Willington	920	---	2	---	2	---	1	---	2	---	---	---	---	---	---	---	---	---	---	---	2	---	1	---	2	---	---	1	--	--	--	--

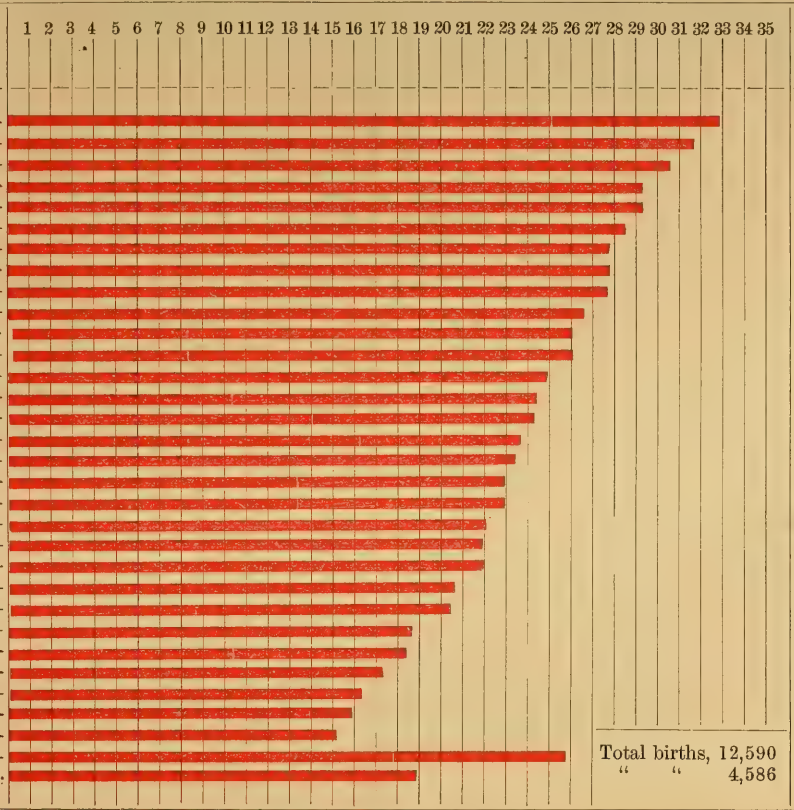
BIRTH RATE.

DIAGRAM **A** SHOWING THE NUMBER OF BIRTHS TO EACH 1,000 OF THE POPULATION IN EACH COUNTY IN CONNECTICUT.



BIRTH RATE.

DIAGRAM B SHOWING THE RATIO OF BIRTHS TO EACH 1000 OF THE POPULATION IN EACH TOWN OF OVER 5000 INHABITANTS IN CONNECTICUT, AND OF THE REMAINDER OF THE STATE.



	Towns.	Birth Rate.
1	Naugatuck,	32.8
2	Waterbury,	31.7
3	Ansonia,	30.6
4	New Haven,	29.4
5	Meriden,	29.4
6	Danbury,	28.4
7	Killingly,	27.8
8	Stamford,	27.8
9	Putnam,	27.7
10	New Britain,	26.7
11	Derby,	26.
12	Vernon,	26.
13	Bridgeport,	24.8
14	Windham,	24.4
15	Hartford,	24.2
16	Wallingford,	23.7
17	Enfield,	23.4
18	Bristol,	22.9
19	Norwich,	22 9
20	Manchester,	22.
21	New London,	21.8
22	Norwalk,	21.8
23	Southington,	20.7
24	Middletown,	20.5
25	Stonington,	18.6
26	Thompson,	18.2
27	Winchester,	17.4
28	Greenwich,	16.2
29	Groton,	15.9
30	Torrington,	15.2
	Aggregate Population of above towns, Total births, 12,590	25.6
	" " " remainder of the State. " " 4,586	18.8

Observe the difference in the birth rate in the urban and rural towns = 6.8

BIRTHS.

There were registered during the year 1889, in the State of Connecticut, 17,176 births, of which 16,524 were born alive and 652 were still-born. Of the whole number of births of which the sex was certified, 8919 were males, 8163 were females. While the sex was not stated in regard to 94.

This is in pleasant contrast with the previous year, and indicates what has been stated on a previous page in this report, that the completeness and accuracy of registration are improving. In the last annual report there were 140 births of which the sex was not stated. This year there are but 94.

The birth-rate has also perceptibly increased, it being 23.4 per 1000 of the population against 22.2 the previous year. There has been an increased rate in every county excepting Hartford and New London. The rate in those counties is not much changed. As last year the highest birth-rates are in the counties which have the largest population, and the birth-rate in them is in the same order as the population, the highest population having also the highest birth-rate. This rule holds good only of the counties of New Haven, Fairfield, and Hartford. Of the other five counties, Tolland, which is smallest in population, gives the highest birth-rate. The county giving the highest birth-rate in the State is New Haven, 27.7, and the lowest birth-rate is in Litchfield County, 18.8. The same two counties illustrated the extremes of the birth-rate in 1888, and also in previous years.

These birth-rates, it should be remembered, are based upon an estimated population; but the estimate is now made from the known census of the year 1890, which census was taken before these estimates were made, while the estimated population of 1888 was based upon less reliable information, and the estimates of that year exceeded those of this year by 25,000. In every county the estimates were higher in 1888 than those adopted in 1889.

Of the sexes given, the proportion of boys to girls was 109.1 boys to 100 girls, against 108.5 in the previous year.

The proportion of births to the whole estimated population of the State (viz: 734,000) is 1 to 42.7 of the people, or 23.4 per 1,000.

Among the large towns the four having the largest birth-rate are all in New Haven County, and were as follows: Naugatuck 32.8; Waterbury 31.7; New Haven and Meriden, each 29.4.

Among the small towns the four having the highest birth-rate are: Portland 33.9; Eastford 32.7; Burlington 32.5; and Voluntown 28.3.

The town having the smallest registered birth-rate in the State is Hartland, 3.5.

The average birth-rate of the towns of over 5,000 inhabitants is 25.6; while that of towns of smaller population is only 18.8.

Of the towns having a city within their limits Waterbury gives the largest birth-rate, 31.7.

The greatest number of births in any one month occurred in July, viz: 1,609. The smallest number in December, viz: 1,324.

The largest number of males were born in July: 830. The largest number of females were born in July: 771.

In the 1st quarter of the year the birth-rate was			23.2.
2nd	"	"	26.6.
3rd	"	"	24.8.
4th	"	"	22.9.

The birth-rate in the State, 23.4.

In Hartford County the town having the highest birth-rate was Burlington, 32.5. It enjoyed the same distinction last year. The lowest was Hartland, 3.5.

In New Haven County, Waterbury again stands highest, 31.7, and Woodbridge the lowest, 7.6.

In New London county the highest birth-rate was in Sprague, 31; the lowest was in Franklin, 6.7.

In Fairfield County Danbury takes the honors, 28.4, while Easton and Monroe share the booby prize, 11.

In Windham County Eastford is highest, 32.7, and Canterbury is lowest, 5.2.

In Litchfield County Canaan wins at 28.8 and the lowest is Morris, 11.8.

In Middlesex County Portland is most fruitful, 33.9, and Essex the most barren, 11.3.

In Tolland County Vernon gives only 26. for highest, and Bolton 4.3 for lowest.

The grand prize for the highest birth-rate of any town in the State is taken by Portland; and Hartland gives the lowest, 3.5.

TABLE XIII—SHOWING AMERICAN AND FOREIGN PARENTAGE OF BIRTHS, BY COUNTIES.

COUNTIES.	PARENTS.				Nativity of Parents not Stated.	Total.
	Both American.	Both Foreign.	Father For., Mother Am.	Father Am., Mother For.		
Hartford	1421	1194	294	237	85	3231
New Haven	2143	2415	511	374	235	5678
New London	811	505	107	109	3	1535
Fairfield	1717	1129	265	266	15	3392
Windham	407	423	75	59	18	982
Litchfield	639	247	66	47	4	1003
Middlesex	402	284	65	48	1	800
Tolland	291	164	59	39	2	555
Total	7831	6361	1442	1179	363	17176

From the foregoing table it appears that of the children born in this State the nativity of whose parents are given, only 45.5 per cent. were of American parentage. In 37 per cent. both parents were of foreign birth, and in 15.2 per cent. one parent was American and the other foreign. New Haven Co. does not make a creditable showing in recording 235 of which the nativity of the parents is not stated. So many omissions must be largely due to negligence.

Still Births by months, sex, and color :

TABLE XIV.—STILL-BIRTHS.

WHITE.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	M'th not stated.	TOTAL.
Male	37	35	31	26	38	32	27	24	20	31	38	21	1	361
Female	38	19	22	20	17	27	19	10	20	21	18	27	--	258
Sex not stated	3	---	---	---	1	---	---	---	1	---	2	1	--	8
COLORED.														
Male	2	2	1	---	1	---	1	3	3	1	2	2	--	18
Female	1	1	2	1	---	---	2	---	---	---	---	---	--	7
Sex not stated	---	---	---	---	---	---	---	---	---	---	---	---	--	---
Grand Total	81	57	56	47	57	59	49	37	44	53	60	51	1	652

The still-births numbered 652, which is 1 still-birth to every 26 living births. In 8 instances the sex of the still-born child is not given; of the remaining 644, 379 were males and 265 were females, showing a marked disproportion of the sexes in still-born infants. The difference was still greater among colored children, in which the males numbered 18 and the females only 7.

Illegitimate births by months, and sex:

TABLE XV.

	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	TOTAL.
Males	9	15	11	5	6	7	10	10	8	7	6	6	100
Females	14	10	7	3	8	9	3	3	7	9	6	7	86
Sex not stated	---	1	1	---	1	---	---	---	---	---	---	---	3
Total	23	26	19	8	15	16	13	13	15	16	12	13	189

Twin-births by months, and sex:

TABLE XVI.

	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	M'th not stated.	TOTAL.
Males	14	14	10	24	18	10	7	12	18	11	10	16	--	164
Females	20	12	16	10	8	12	19	20	12	13	12	10	--	164
Sex not stated	---	---	---	---	---	---	---	---	2	---	---	---	2	4
Triplets: Males	2	---	---	---	---	---	---	---	---	---	---	---	--	2
Triplets: Females	1	---	---	---	---	---	---	---	---	---	---	---	--	1
Total	37	26	26	34	26	22	26	32	32	24	22	26	2	335

Twins and Illegitimate Births by Counties for past ten years, with the sexes for 1889 :

TABLE XVII.

COUNTIES.	1889. Twins. Males.	1889. Twins. Females.	1889. Twins. Sex not stated.	1889. Twins. Total.	1889. Illegitimate. Males.	1889. Illegitimate. Females.	1889. Illegitimate. Sex not stated.	1889. Illegitimate. Total.	1888. Twins.	1888. Illegitimate.	1887. Twins.	1887. Illegitimate.	1886. Twins.	1886. Illegitimate.	1885. Twins.	1885. Illegitimate.	1884. Twins.	1884. Illegitimate.	1883. Twins.	1883. Illegitimate.	1882. Twins.	1882. Illegitimate.	1881. Twins.	1881. Illegitimate.	1880. Twins.	1880. Illegitimate.	Total for 10 Years. Twins.	Total for 10 Years. Illegitimate.	Average for 10 Years. Twins.	Average for 10 Years. Illegitimate.
Hartford	32	32	..	64	20	21	2	43	*76	34	74	27	64	44	55	38	45	34	38	42	†65	52	†35	33	†28	34	544	379	54·4	37·9
New Haven	62	46	..	108	27	30	..	57	72	59	94	52	76	44	68	33	†86	47	130	39	68	39	40	41	†27	35	769	446	76.9	44.6
New London	9	11	4	24	13	7	..	20	32	20	30	28	24	24	†35	23	†45	29	48	30	24	21	16	18	22	23	300	236	30.0	23.6
Fairfield	29	33	..	62	15	8	..	23	†53	29	50	25	26	22	†51	21	55	29	†43	30	54	32	18	30	28	23	440	264	44.0	26.4
Windham	8	10	..	18	7	4	..	11	4	7	10	8	16	4	12	7	15	7	18	13	16	11	44	13	13	14	166	95	16.6	9.5
Litchfield	10	14	..	24	10	8	1	19	12	6	22	9	16	9	20	12	24	3	32	9	24	7	12	6	9	8	195	88	19.5	8.8
Middlesex	12	15	..	†27	7	6	..	13	†29	6	14	7	†9	4	16	8	18	9	16	13	20	6	16	3	3	3	168	72	16.8	7.2
Tolland	4	4	..	8	1	2	..	3	12	7	10	8	14	2	16	9	12	5	8	4	10	3	4	8	4	6	98	55	9.8	5.5
Total	166	165	4	335	100	86	3	189	290	168	304	164	245	151	273	151	300	163	333	180	281	171	185	152	134	146	2680	1635	268.0	163.5

* Includes two sets of triplets.

† Each includes one set of triplets.

TABLE XVIII.

Years.	American Parents.	Per cent.	Foreign Parents.	Per cent.	Foreign. American.	Per cent.	Not stated.	Per cent.	Total Births.
1889	7,831	45.5	6,361	37.0	2,621	15.2	363	2.1	17,176
1888	7,640	45.2	6,039	35.7	2,615	15.4	584	3.4	16,878
1887	7,551	45.5	5,735	34.5	2,541	15.3	756	4.5	16,583
1886	7,437	46.6	5,498	34.5	2,503	15.7	496	3.1	15,934
1885	7,245	46.7	5,023	32.4	2,660	17.2	568	3.7	15,496
1884	7,418	47.0	5,871	37.2	2,236	14.1	233	1.4	15,758
1883	7,216	45.5	6,110	38.5	2,198	13.9	332	2.1	15,856
1882	7,142	49.	5,431	36.	2,105	14.	260	1.	14,938
1881	6,734	46.	5,229	35.7	1,737	12.	916	6.3	14,616
1880	6,585	47.	5,101	37.	1,656	12.5	487	3.5	13,829

TABLE XIX.—BIRTH-RATE BY COUNTIES.

COUNTIES.	YEAR.									
	1889.	1888.	1887.	1886.	1885.	1884.	1883.	1882.	1881.	1880.
Hartford	22.4	22.5	22.8	23.1	24.3	23.6	26.8	23.9	23.1	22.2
New Haven	27.7	26.3	26.3	25.6	25.7	27.2	31.7	28.8	27.8	24.6
New London	20.1	20.4	19.9	19.8	20.4	21.2	21.6	21.3	21.5	21.4
Fairfield	23.0	22.	23.2	21.9	21.9	20.9	24.9	23.8	22.0	20.8
Windham	21.8	18.9	20.6	20.9	21.3	20.3	26.1	24.6	23.9	25.4
Litchfield	18.8	16.3	18.3	17.1	18.9	18.9	20.1	18.2	19.8	19.6
Middlesex	20.7	18.6	20.1	19.4	20.4	21.5	19.3	19.0	19.7	18.8
Tolland	22.1	18.3	19.6	18.5	18.0	20.2	19.4	20.0	21.8	19.7
State of Connecticut	23.4	22.2	22.8	22.2	22.6	23.5	25.4	23.9	22.4	22.2

TABLE XX.—SHOWING A NATIONALITY OF PARENTS BY COUNTIES.

COUNTIES.	American.	Irish.	English.	German.	Canadian.	Scotch.	Welsh.	French.	Spanish.	Italian.	Swiss.	Austrian.	Belgian.	Hungarian.	Prussian.	Bohemian.	Danish.	Swedish.	Polish.	Norwegian.	Finland.	Russian.	Portuguese.	Newfoundland.	American and Foreign.	Mixed Foreign.	Foreign not stated.	Not stated.
Hartford	1421	451	70	227	63	12	---	1	---	50	4	---	1	1	3	1	36	100	10	1	---	45	---	---	530	92	26	85
New Haven	2143	827	137	459	186	31	7	4	---	155	7	11	2	3	---	---	9	116	6	1	2	156	---	---	884	203	89	235
New London	811	151	33	44	148	11	---	1	---	9	1	---	---	---	---	---	---	17	1	1	1	10	21	---	215	56	---	3
Fairfield	1717	413	76	237	27	20	---	5	---	50	9	47	---	33	---	15	5	66	7	6	---	8	---	---	531	103	---	15
Windham	407	39	9	2	324	1	---	---	---	1	---	---	---	---	---	---	---	17	---	---	---	---	---	---	137	27	---	18
Litchfield	639	75	40	41	35	5	---	6	---	---	4	1	1	---	1	1	1	13	3	---	---	---	---	---	112	21	---	4
Middlesex	402	58	10	42	7	7	---	---	---	2	---	---	---	---	---	---	1	136	1	---	1	1	---	---	112	18	---	1
Tolland	291	20	9	81	30	2	---	1	---	---	2	---	---	---	---	---	1	2	1	---	---	---	---	---	98	15	---	2
Total, 1889	7831	2034	384	1133	820	89	7	18	---	267	27	59	4	37	4	17	53	467	29	9	4	220	21	---	2619	535	115	363
Total, 1888	7640	2181	369	1044	818	103	6	25	---	200	13	25	1	32	1	4	41	388	23	7	8	136	8	---	2615	501	105	584
Total, 1887	7541	2157	344	1063	817	76	8	20	---	158	28	6	1	38	4	3	29	320	7	15	1	83	14	---	2541	437	116	756
Total, 1886	7441	2140	323	1028	781	87	7	45	---	112	19	8	---	15	2	6	40	260	15	11	---	55	15	---	2590	497	44	495
Total, 1885	7245	1773	350	985	744	74	2	15	1	78	16	7	2	14	3	7	30	237	17	5	2	31	17	---	2206	415	---	493
Total, 1884	7326	2729	377	958	714	72	8	25	---	99	11	3	---	5	---	---	22	186	6	11	---	41	8	3	2130	458	30	263
Total, 1883	7219	3035	362	899	798	66	6	62	---	48	20	8	1	---	---	---	17	207	6	4	---	47	13	---	2179	434	65	325
Total, 1882	7142	2682	336	877	693	43	---	34	---	29	6	---	---	---	---	---	6	129	---	---	---	9	---	---	2105	502	---	---
Total, 1881	6734	2901	316	853	707	44	---	17	---	13	12	---	---	---	---	---	5	79	---	---	---	---	---	---	1737	328	---	---
Total, 1880	6585	2682	303	600	794	41	---	9	---	24	4	---	---	---	---	---	13	55	---	---	---	---	---	---	1678	434	---	---

MARRIAGES.

There were 5,744 marriages registered during the year 1889, being 225 less than in 1888.

This is one marriage to every 127.7 of the population, or a marriage rate of 7.82 per 1,000.

TABLE XXI.—MARRIAGES.

BRIDES.	12–15.	15–20.	20–30.	30–40.	40–50.	50–60.	60–70.	70–80.	80–90.	Age not stated.	Total.
First Marriage	--	835	3,781	422	62	12	4	----	----	----	5,116
Second "	--	---	173	227	130	48	10	6	----	----	594
Third "	--	---	1	5	13	9	3	2	----	----	33
Fourth "	--	---	----	----	----	----	1	----	----	----	1
Fifth "	--	---	----	----	----	----	----	----	----	----	----
No. not stated	--	---	----	----	----	----	----	----	----	----	----
Total, 1889	--	835	3,955	654	205	69	18	8	----	----	5,744
" 1888	1	897	4,144	627	191	82	25	----	----	2	5,969
" 1887	2	876	3,977	642	209	56	19	1	----	6	5,788
" 1886	1	840	2,791	604	185	58	21	9	----	3	5,512
" 1885	1	833	3,389	563	208	57	25	5	----	1	5,091
" 1884	1	868	3,418	619	173	78	21	4	----	212	5,394
" 1883	1	787	3,648	526	184	70	20	5	----	199	5,440
" 1882	2	719	3.447	546	162	67	21	2	----	----	5,049
" 1881	--	705	2,959	774	156	62	25	5	----	----	4,687
" 1880	5	860	2,819	669	183	55	24	10	----	----	4,625
GROOMS.											
First Marriage	--	100	3,742	868	131	16	5	----	----	----	4,862
Second "	--	1	120	293	196	117	64	9	3	----	803
Third "	--	---	3	13	18	16	13	7	----	----	70
Fourth "	--	---	----	1	1	3	2	2	----	----	9
Fifth "	--	---	----	----	----	----	----	----	----	----	----
No. not stated	--	---	----	----	----	----	----	----	----	----	----
Total, 1889	--	101	3,865	1,175	346	152	84	18	3	----	5,744
" 1888	--	115	4,129	1,142	311	163	73	14	3	19	5,969
" 1887	--	108	3,979	1,090	320	150	79	16	1	45	5,788
" 1886	--	108	3,764	1,059	316	149	75	29	----	12	5,512
" 1885	--	106	3,508	945	305	119	69	21	1	8	5,091
" 1884	--	92	3,054	1,355	274	151	79	24	1	364	5,394
" 1883	--	89	3,604	976	299	143	61	24	1	243	5,440
" 1882	--	77	3,464	771	293	139	68	24	3	----	5,049
" 1881	--	89	3,165	921	299	122	65	21	5	----	4,687
" 1880	--	207	3,134	898	214	116	43	18	5	----	4,625

Table XXII.—COMPARATIVE AGES OF AMERICAN AND FOREIGN-BORN MOTHERS.

NO. OF MOTHERS AT BIRTH OF—	American Mothers.							Totals.										Foreign Mothers.						Totals.										Total for Ten Years		Nationality and age not stated.
	15–18.	18–20.	20–30.	30–40.	40–50.	50–60.	Age not stated.	1889.	1888.	1887.	1886.	1885.	1884.	1883.	1882.	1881.	1880.	15–18.	18–20.	20–30.	30–40.	40–50.	Age not stated.	1889.	1888.	1887.	1886.	1885.	1884.	1883.	1882.	1881.	1880.	American.	Foreign.	
1st child	138	381	1993	291	13	..	1	2817	2885	2747	2705	2688	2727	2744	2541	2554	2637	29	168	1356	209	17	...	1779	1723	1461	1362	1389	1349	1316	1559	1263	1157	27045	14358	....
2d "	8	108	1567	431	20	..	3	2137	2003	1923	2049	1884	1919	2893	1762	1805	1638	2	32	1106	288	8	2	1438	1307	1296	1222	1027	1040	1043	815	940	933	20013	11061	1
3d "	...	11	871	524	22	..	1	1429	1387	1433	1426	1294	1390	1225	1295	1128	1163	1	8	718	360	12	1	1100	1063	983	937	821	822	762	651	811	906	13170	8856	....
4th "	...	3	463	473	32	..	..	971	918	972	942	899	834	806	860	839	793	..	6	422	418	28	...	874	799	741	720	607	666	665	639	879	819	8834	7409	....
5th "	...	...	227	409	37	..	..	673	648	630	597	555	574	559	555	571	487	..	1	196	367	33	...	597	579	536	531	500	598	612	607	762	659	5849	5981	....
6th "	..	1	95	335	42	..	..	473	381	400	394	381	390	358	356	414	319	..	1	91	323	38	...	453	455	456	449	423	585	527	443	478	531	3866	4800	....
7th "	...	...	20	225	33	..	..	278	282	257	262	261	235	213	206	214	195	..	1	41	233	59	...	334	366	352	337	393	449	436	323	400	510	2403	3900	....
8th "	...	...	10	133	26	..	..	169	168	156	164	166	140	138	113	73	75	..	...	13	190	71	...	274	286	285	288	244	337	315	299	153	128	1362	2609	....
9th "	...	...	3	91	24	..	..	118	97	117	111	99	82	81	67	42	51	..	...	10	130	53	...	193	185	170	207	214	251	232	186	129	87	865	1854	1
10th "	...	...	2	55	22	1	..	80	68	55	55	48	50	46	28	27	30	..	...	1	73	42	...	116	134	178	134	110	135	146	139	94	64	487	1250	....
11th "	...	...	2	31	9	..	..	42	34	37	27	37	24	27	19	18	25	..	...	3	43	24	...	70	74	108	88	65	55	105	63	41	27	290	696	....
12th "	...	...	....	19	7	..	..	26	18	15	14	13	14	14	12	12	15	..	...	3	39	32	...	74	61	73	41	49	42	85	41	34	36	153	536	....
13th "	...	...	....	8	5	..	..	13	8	9	6	8	6	8	3	6	6	..	...	....	20	22	...	42	32	36	25	30	38	68	36	9	7	73	323	....
14th "	...	...	....	4	4	..	..	8	3	5	4	3	3	1	2	2	....	..	...	....	4	17	...	21	22	23	22	19	18	17	18	8	6	31	174	....
15th "	...	...	....	....	1	..	..	1	....	5	1	2	2	3	1	....	1	..	...	....	5	6	...	11	12	13	9	11	7	7	11	4	....	16	85	....
16th "	...	..	....	....	....	..	..	....	1	1	....	2	1	....	....	....	....	..	...	....	4	3	...	7	6	6	6	5	4	3	3	....	3	5	43	....
17th "	...	...	....	....	....	..	..	....	2	....	....	....	....	....	2	2	....	..	...	....	1	4	...	5	1	4	1	1	3	2	3	2	....	6	22	....
18th "	...	...	....	....	....	..	..	....	1	....	....	....	....	....	....	1	....	..	...	....	....	1	...	1	....	4	....	....	1	1	1	3	....	2	11	....
19th "	...	...	....	....	....	..	..	....	....	....	....	....	....	1	....	....	....	..	...	....	....	....	...	....	1	....	....	1	1	1	....	....	....	1	4	....
20th "	...	...	....	....	....	..	..	....	....	....	....	....	....	....	....	1	....	..	...	....	2	....	...	2	....	....	....	....	....	1	....	4	....	1	7	....
21st "	...	...	....	....	....	..	..	....	....	....	....	....	....	....	....	....	....	..	...	....	....	....	...	....	9	1	....	1	....	....	....	....	....	....	11	....
Between 10th and 20th	..	...	....	....	1	..	..	1	6	5	6	3	....	....	....	....	....	..	...	....	5	4	...	9	....	16	14	25	....	21	....	....	....	21	85	....
No. not stated	...	...	1	1	...	..	14	16	167	101	46	148	....	108	....	....	....	..	...	1	....	2	108	111	66	43	44	200	....	341	....	....	....	586	805	411
Total	146	504	5254	3030	298	1	19	9252	9077	8868	8809	8491	8391	9225	7822	7709	7435	32	217	3961	2714	476	111	7511	7181	6785	6437	6135	6401	6706	5837	6014	5873	85079	64880	413

There were 5,116 first-marriage brides, which was 212 less than the year before. There were 594 brides who ventured a second experience, being 16 of that list less than the year before. There were 33 brides who took a third husband, being 3 more than the previous year; and one who entered the fourth time in matrimony.

Of grooms there were 4,862 who entered for the first time upon connubial felicity, being 196 less than the previous year. There were 803 who ventured the second time into matrimony, being 16 less of that list than in the previous year; there were 70 who took a third wife, being 13 less than the year before; and there were 9 who had been so happy with their first three wives that they made no unnecessary delay in taking a fourth.

TABLE XXIII.—TABLE OF DIVORCES, 1889.

COUNTIES.	TOTAL IN—											
	1889.	1888.	1887.	1886.	1885.	1884.	1883.	1882.	1881.	1880.	1879.	1878.
Hartford	93	81	69	80	75	74	77	66	80	49	51	74
New Haven	150	136	107	103	106	71	119	125	121	96	84	111
New London	62	61	45	43	28	44	47	40	38	32	35	52
Fairfield	146	65	71	63	94	84	101	86	78	63	63	74
Windham	21	17	33	38	27	22	30	16	36	33	27	28
Litchfield	29	33	22	24	22	18	25	23	35	32	24	23
Middlesex	12	16	12	12	12	22	34	23	6	11	14	18
Tolland	23	21	28	24	19	25	18	23	10	16	19	21
Total	536	430	387	387	383	360	451	392	404	332	316	401

TABLE XXIV.—DIVORCES GRANTED IN THE STATE OF CONNECTICUT BY THE SUPERIOR COURT DURING 1889.

CAUSES.	Hartford County.	New Haven County.	New London County.	Fairfield County.	Windham County.	Litchfield County.	Middlesex County.	Tolland County.	Total.
Adultery	29	29	15	28	3	7	1	4	116
Desertion	27	61	23	60	12	14	3	5	205
Intemperance	17	27	9	22	3	5	1	7	91
Cruelty	13	16	11	19	2	3	3	1	68
Intemperance and cruelty	4	12	1	11	1	----	2	3	34
Intemperance and desertion	1	4	----	3	----	----	----	----	8
Desertion and cruelty	1	----	----	----	----	----	----	----	1
Desertion, cruelty and int'mp'rance	----	----	----	1	----	----	----	----	1
Adultery and cruelty	1	----	----	----	----	----	----	1	2
Adultery, cruelty and desertion	----	----	----	1	----	----	----	----	1
Adultery and intemperance	----	----	3	----	----	----	1	----	4
Fraudulent contract	----	----	----	1	----	----	1	----	2
Sodomy	----	----	----	----	----	----	----	1	1
Infamous crime	----	----	----	----	----	----	----	1	1
Imbecility	----	1	----	----	----	----	----	----	1
Total	93	150	62	146	21	29	12	23	536

DEATHS.

The recorded mortality in 1889 exclusive of still-births numbered 12,529, being 451 less than in the preceding year. Upon an estimated population of 734,000 the death-rate was 17 per 1,000.

The above population is based upon the census of 1880 and of 1890, which latter was taken and announced before these estimates were made. It makes the total population of the State about 25,000 less than the estimates of last year, and is doubtless a closer approximation to the true number of inhabitants than the crude guesses of last year.

The deaths of males amounted to 6,461, of females to 6,042, while there were 26 of whom the sex was not stated. The greatest mortality occurred in July, and reached 1,367; the smallest in January, and was 912.

The annual rates represented by the deaths registered in each quarter were as follows:

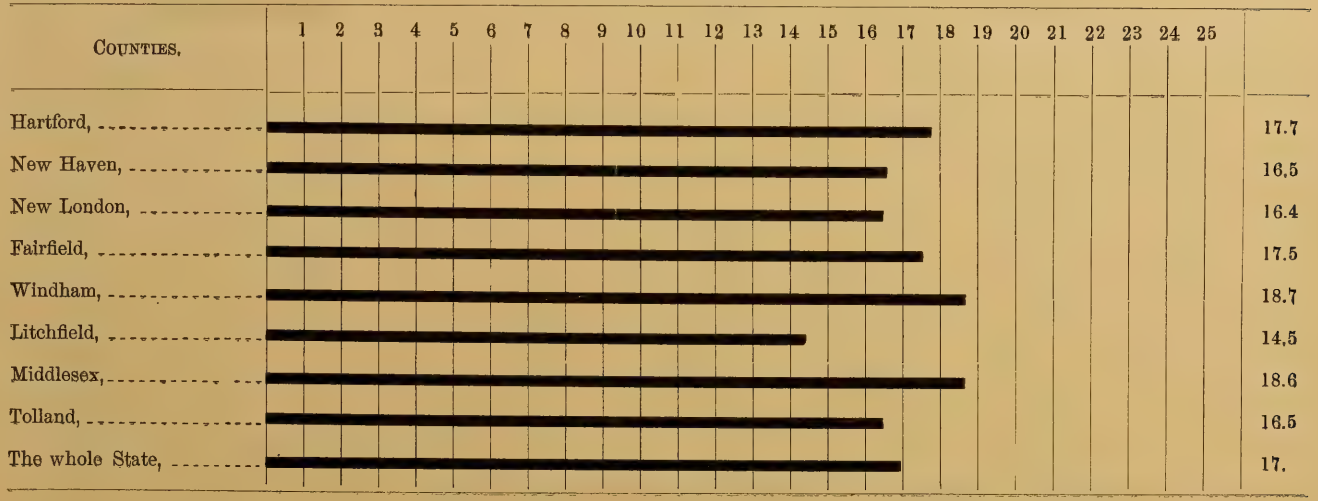
						Total deaths.
First quarter,	16.	per 1,000	of living	population,		2944
Second "	16.3	"	"	"		3004
Third "	19.8	"	"	"		3645
Fourth "	15.9	"	"	"		2936
The annual death-rate was 17.						12,529

CAUSES OF DEATH.

The number of deaths registered of which no cause was given in 1889 was only 71 out of a total of 12,529, being 0.5 of total mortality. This is another evidence of greater attention to registration: the number of deaths last year in which the cause of death was not given was 99, and the year previous it was 215. It affords a striking illustration of the value of the recent legislation requiring the death certificate of every decedent before his burial is permitted.

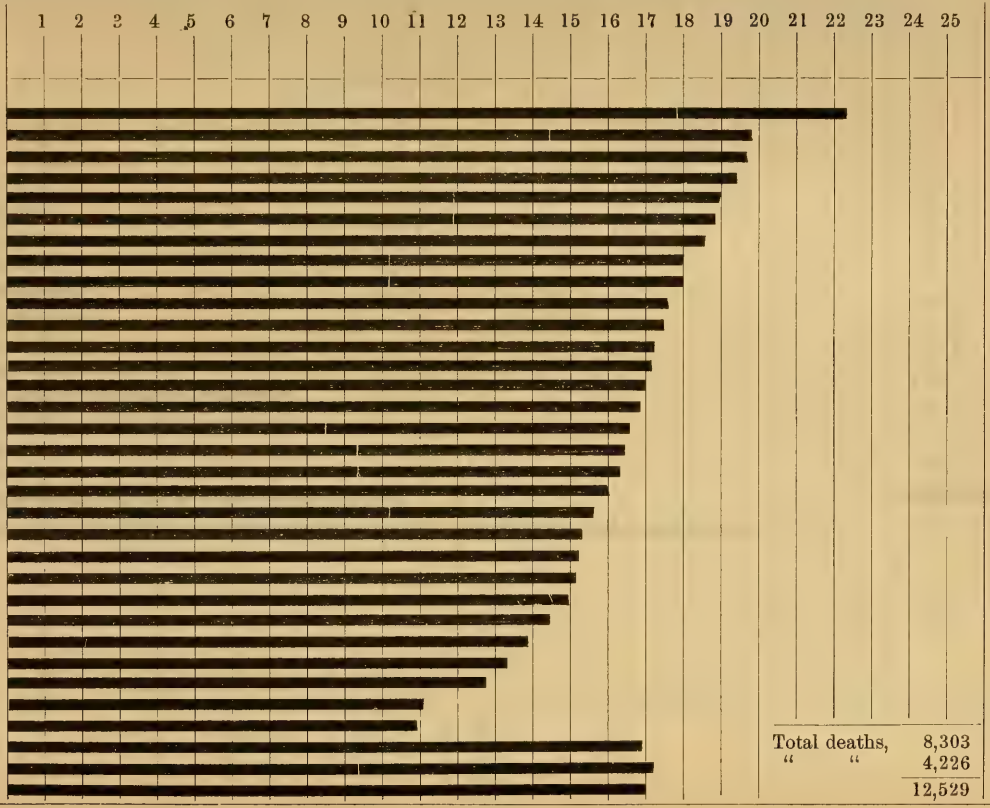
DEATH RATE.

DIAGRAM SHOWING THE NUMBER OF DEATHS TO EACH 1,000 OF THE POPULATION IN EACH COUNTY IN CONNECTICUT.



DEATH RATE.

DIAGRAM SHOWING THE NUMBER OF DEATHS TO EACH 1000 OF THE POPULATION IN EACH TOWN OF OVER 5000 INHABITANTS IN CONNECTICUT, AND OF THE REMAINDER OF THE STATE.

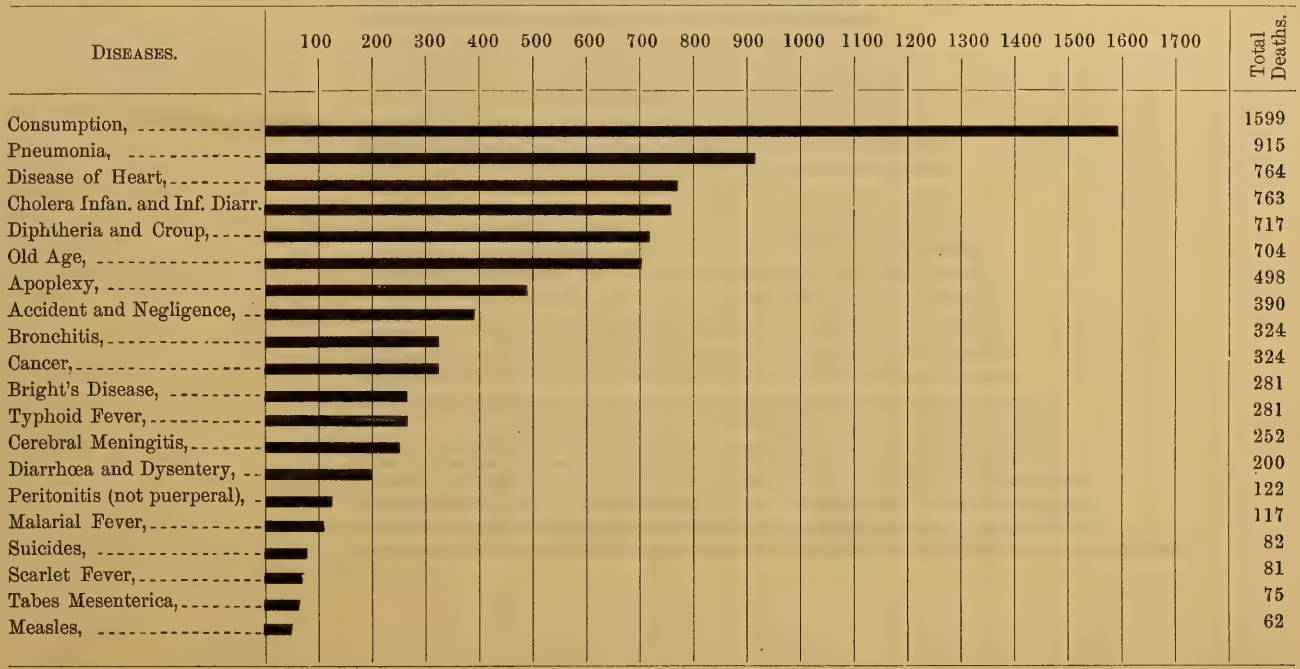


	Towns.	Death Rate.
30	Putnam,	22.3
29	Killingly,	19.7
28	Hartford,	19.6
27	Thompson,	19.4
26	Stamford,	19.
25	New London,	18.8
24	Vernon,	18.6
23	Naugatuck,	18.
22	Enfield,	18.
21	Stonington,	17.6
20	Danbury,	17.5
19	Bridgeport,	17.4
18	Derby,	17.3
17	Meriden,	17.
16	New Haven,	16.9
15	New Britain,	16.6
14	Groton,	16.4
13	Windham,	16.3
12	Waterbury,	16.
11	Wallingford,	15.6
10	Greenwich,	15.4
9	Norwalk,	15.2
8	Manchester,	15.1
7	Bristol,	14.8
6	Norwich,	14.4
5	Middletown,	13.8
4	Ansonia,	13.3
3	Winchester,	12.8
2	Torrington,	11.
1	Southington,	10.9
	Aggregate Population of above towns,	16.9
	" " " remainder of the State,	17.3
	" " " the whole State,	17.

Total deaths,	8,303
" "	4,226
	12,529

DEATH RATE.

DIAGRAM EXHIBITING THE COMPARATIVE MORTALITY BY ABSOLUTE NUMBERS FROM TWENTY PROMINENT CAUSES OF DEATH IN CONNECTICUT IN 1890.



Vague and indefinite causes of death are however still too frequently given by physicians, obviously in many cases where more exactness would be practicable. Such causes as "Debility," "Abscess," "Dropsy," "Hemorrhage," and such like expressions unaccompanied by any explanatory statements, renders them wholly useless for statistical purposes.

The following table exhibits the increasing attention to accuracy in registration since the organization of the State Board of Health and its superintendence of this work.

DEATHS FROM UNKNOWN OR UNSPECIFIED CAUSES OF DEATH AND PERCENTAGES, 1878–1889 (12 YEARS).

Year.	Total deaths.	Deaths from causes not stated.	Percentage of total mortality.
1878	9,352	624	6.6
1879	9,394	545	5.8
1880	10,408	536	5.1
1881	10,907	502	4.6
1882	11,662	390	3.3
1883	11,926	369	3.1
1884	11,351	377	3.4
1885	12,033	437	3.6
1886	11,616	305	2.6
1887	12,385	215	1.7
1888	12,980	99	.8
1889	12,529	71	.5

CAUSES OF DEATH CONSIDERED BY CLASSES.

Class I.—Zymotic Diseases.

The deaths from zymotic diseases registered in 1889 amounted to 2,602, or 20.78 of the whole mortality. The deaths from this class of diseases were 179 less than in the year before.

As this class of diseases is the one most influenced by hygienic conditions it is a good indication of improved hygiene that the deaths resulting from it are at all diminished. It is true the diminution is not much, but it is also true that the actual betterment of unsanitary conditions has not been made yet very conspicuous throughout the State. The great majority of local health boards are inexperienced and unfamiliar with their duties, and far too many of the annual reports say that there has been

no occasion for any work in their respective towns. The truth is, however, that as yet there is no town in Connecticut that has reached that standard of sanitary excellence that nothing remains to be done to improve it. What town now in the State can boast of sewage disposal methods which are faultless; of an abundant and universal supply of good water; of adequate drainage in all its parts; of prompt and satisfactory garbage disposal; of clean streets and well made sidewalks; of neatly kept back yards; of dry, white-washed, and wholesome cellars; of no ill-ventilated and over-crowded tenement houses; and in which all the minor details of plumbing, sunlight, and air space receive due attention? Where is the town in Connecticut in which every case of infectious disease is immediately put under such judicious and precautionary care, both for the welfare of the patient and for the safety of the public, that the danger of the spread of such infection is reduced to the minimum?

Until there is some approach to such conditions, the annual reports of local boards of health, stating that they have had no occasion for any official action during a year, only betrays their want of a true appreciation of their duties and functions. And as a corollary to this truth, there will be no rapid and conspicuous change for the better in the general health of the citizens of Connecticut until the local boards of health do acquire a practical realization of their duties and responsibilities.

From the causes of death as registered under the different classes, the percentage of each was as follows:

Classes.	Deaths.	Percentage of Total Mortality.
From the Zymotic	2,602	20.78
" Parasitic	1	.01
" Dietetic	57	.45
" Constitutional	2,220	17.72
" Developmental	1,000	7.98
" Local	5,192	41.44
" Violent	580	4.63
" Unclassified or not stated	877	7.00
	12,529	100.00

The following table gives the percentage of deaths by classes* for 12 years, 1878–1889:

* Excluding deaths from unclassified and unspecified, and also still-births.

Years.	Zymotic.	Parasitic.	Dietetic.	Constitutional.	Developmental.	Local.	Violence.
1878	22.61	----	.37	20.39	10.72	31.83	4.50
1879	18.72	----	.41	19.49	11.52	37.34	4.34
1880	22.82	.06	.45	19.12	10.36	37.85	3.95
1881	23.03	----	.57	20.27	11.79	36.03	3 53
1882	24.70	.02	.48	18.92	11.42	36.76	4.25
1883	23.69	.02	.38	18.43	11.78	35.47	4.20
1884	21.27	.02	.41	19.43	12.73	35.69	3.72
1885	19.36	.01	.41	18.40	12.34	38.71	4.11
1886	19.31	.01	.55	17.80	12.69	37.80	4.20
1887	21.40	.01	.38	17.45	7.99	40.45	4.24
1888	21.40	.09	.34	17.73	7.25	42.55	4.28
1889	20.7	.01	.45	17.72	7.98	41.44	4.63

A brief reference to some of the special diseases of the zymotic class may be of interest:

Small Pox.—Connecticut wholly escaped any fatal results of this disease during the full year. Notwithstanding it had gained a foothold in the State in seven different towns, such is the power of isolation, vaccination, and disinfection, when judiciously and promptly employed, it was literally exterminated from our borders for the space of a whole year, and only again found an entrance in the last week of 1889, through that too frequent door of admission, the rag room of a paper mill.

Measles.—This disease caused 62 deaths against 41 in the previous year. There were fatal cases in every county in the State. In 5 different towns in Hartford County with 21 deaths. In 4 towns in New Haven County with 11 deaths. In 4 towns in New London County with 6 deaths. In 2 towns in Fairfield County with 13 deaths. In 3 towns in Windham County with 8 deaths. In only one town in each of the counties of Litchfield, Middlesex, and Tolland, and only one death in each. The mortality was greatest in Bridgeport, which suffered 10 deaths from this disease. It is a too popular belief that measles is a very mild and safe disease which it is the fate of all children to acquire, and hence it is of little importance to try to avoid it. The truth is that although the percentage of deaths ascribed directly to measles is not large, yet it is considerable, but the mortality is not the true measure of its power for evil. It has long been recognized by observant physicians that measles in many subjects develop predisposing conditions favorable to the germination of the seeds of more fatal disorders.

Scarlet Fever was fatal in 81 instances during the year; which was 59 less than in the year before. Tolland County alone escaped a fatal result. Of the towns, it was most fatal in Stamford, where it caused 15 deaths, Danbury, 14 deaths, and in Bridgeport, 11 deaths. The counties suffered as follows:

Hartford County	10	deaths	in	6	towns.
New Haven "	13	"		5	"
New London "	3	"		3	"
Fairfield "	51	"		10	"
Windham "	1	"		1	"
Litchfield "	1	"		1	"
Middlesex "	2	"		1	"
Tolland "	0	"			

Scarlet Fever it is believed is always communicated from the infection of a previous patient. It follows that if the first patient had been properly guarded the subsequent cases would have escaped. The inevitable conclusion is that the great majority of these deaths may be fairly attributed to culpable negligence and carelessness.

Diphtheria and Croup, which by many pathologists are believed to be identical, are here enumerated together. They caused 717 deaths in 1889 against 556 in 1888 and 488 in the year before. This shows a marked and progressive increase of these dangerous maladies. It also seems to indicate that the precautions, which in the State of Michigan have proved so effectual in preventing their spread, have in this State been grossly neglected. There can be no doubt that if isolation of patients and the thorough use of disinfectants arrest such outbreaks in Michigan the same means if faithfully applied would be equally effective in Connecticut. The loss of over 700 lives in a year is so serious a matter that it ought to attract concentrated attention upon the means of averting the continuation of such a sacrifice of human life.

Dr. Henry B. Baker, the practical and energetic Secretary of the State Board of Health of Michigan, has shown by actual enumeration of the outbreaks of diphtheria in that State, that the average number of cases which occurred in every outbreak where isolation and disinfection were neglected was 15.50 with 2.38 deaths. And that the average number of cases where these

precautions were enforced was only 1.74 and .53 deaths. That is a practical lesson which Connecticut would do well to heed. One half the towns in the State have yielded as victims to these diseases one or more human lives. Every part of the State has made its sacrifices. The mortality has occurred county wise as follows :

Hartford	County	190	deaths in	19	towns.
New Haven	"	242	"	14	"
New London	"	50	"	11	"
Fairfield	"	134	"	15	"
Windham	"	44	"	5	"
Litchfield	"	16	"	7	"
Middlesex	"	22	"	7	"
Tolland	"	19	"	5	"

The highest death-rate from these diseases occurred in Putnam where it was over 5 per 1,000 of the population. The next highest death-rate was in Meriden, 2.7 per 1,000, and the third highest was Hartford, 2.1 per 1,000.

Whooping Cough killed 92 in 1889 against a death list of 76 in the year before. It was quite unequally distributed through the State. There were no deaths from it in Tolland County and only one each in Middlesex and Litchfield.

There were deaths caused by it in 31 towns. The severest epidemic of it was in Waterbury.

The mortality from whooping cough is at its maximum in the first year of life, in which respect it differs from measles, scarlet fever, diphtheria, and typhoid fever, all of which reach their maxima in a later year. After the first year the mortality from this disease gradually and rapidly diminishes with each year of life until the tenth, after which a fatal result is rare.

Typhoid Fever was fatal in 281 instances during the year, which was 11 less than in the previous year.

The following table exhibits the number of

DEATHS FROM TYPHOID FEVER BY COUNTIES,

FOR 36 YEARS—1854–1889.

	Hartford County.	New Haven County.	New London County.	Fairfield County.	Windham County.	Litchfield County.	Middlesex County.	Tolland County.	Total.	Per cent. to known causes.
1854	83	74	13	26	23	40	17	8	284	6.20
1855	58	62	32	15	25	28	27	20	273	5.50
1856	47	62	31	16	29	36	20	15	256	4.62
1857	61	58	28	15	27	35	29	14	267	4.55
1858	68	68	25	35	25	34	16	24	285	4.89
1859	78	55	25	48	26	36	17	22	307	5.30
1860	59	91	24	28	35	40	20	17	314	5.60
1861	92	74	32	34	42	32	23	31	360	5.25
1862	99	83	45	46	24	36	24	24	381	5.10
1863	112	96	61	39	19	45	28	27	427	5.71
1864	97	117	52	43	18	54	29	32	442	5.44
1865	129	97	80	50	60	57	42	27	548	7.79
1866	77	79	49	37	36	20	15	19	332	5.95
1867	117	105	38	38	25	46	19	28	415	6.39
1868	81	104	32	33	31	30	30	25	366	5.54
1869	84	130	35	59	38	48	38	30	458	5.63
1870	87	124	31	54	37	44	35	25	427	5.49
1871	64	111	25	53	31	34	29	5	352	4.93
1872	134	134	37	67	39	39	32	24	506	5.76
1873	114	117	37	43	33	41	24	21	430	5.00
1874	69	109	40	31	32	32	28	21	370	4.68
1875	103	119	38	45	40	44	32	28	449	3.11
1876	76	79	42	42	25	32	12	20	327	3.58
1877	80	80	33	40	25	26	17	28	329	3.32
1878	39	55	30	28	27	27	25	15	346	2.70
1879	30	24	34	26	14	15	5	11	169	1.77
1880	40	47	32	31	34	21	19	18	242	2.51
1881	52	68	23	32	30	18	19	15	257	2.45
1882	64	76	35	35	37	28	24	25	325	3.10
1883	49	118	26	29	28	18	14	20	292	2.14
1884	61	93	29	30	25	11	16	16	281	2.47
1885	66	56	22	31	18	19	8	7	227	1.09
1886	50	70	19	30	29	21	13	12	244	2.15
1887	33	51	15	37	19	14	12	14	195	1.16
1888	75	95	16	31	28	21	15	11	292	2.21
1889	62	62	26	68	20	21	6	16	281	2.25

The average number of deaths annually in Connecticut for the past 36 years, as shown by the above table, was 335.

No disease is more fully and completely subject to known means of restriction than Typhoid Fever. It will not be credita-

ble to the executive ability of local health boards in the sanitary administration of towns if so high a mortality continues much longer.

MORTALITY FROM PROMINENT ZYMOTIC DISEASES—10 YEARS.

Years.	Diseases.									
	Small Pox.	Measles.	Scarlet Fever.	Typhoid Fever.	Whooping Cough.	Diphtheria.	Membranous Croup.	Infantile Diarrhœa.	Dysentery.	Total.
1880	9	59	92	242	104	332	181	570	69	1658
1881	31	14	121	257	59	333	178	526	101	1620
1882	9	48	352	324	65	264	181	696	155	2094
1883	8	104	303	291	91	481	155	609	101	2143
1884	--	45	208	281	76	345	164	683	114	1916
1885	--	154	286	227	64	348	151	494	121	1845
1886	--	9	117	244	106	359	203	590	176	1804
1887	4	95	117	195	70	317	171	900	286	2155
1888	3	41	140	292	76	370	186	953	168	2229
1889	--	62	81	281	92	584	133	763	146	2142
Av'ge.	6.	63.	182.	263.	80.	373.	170.	678.	144.	1961.

The deaths from the above 9 principal zymotic diseases registered in 1889 form 17 per cent. of the deaths from all causes, and are equal to 291 in every 100,000 of persons living.

Class II.—Parasitic Diseases.

The mortality from this class is always small. Only one death, that from "Thrush" was attributed to the class during the year.

Class III.—Dietetic Diseases.

There were 57 deaths registered in this class, all of which were from the various effects of the abuse of alcoholic drinking.

Class IV.—Constitutional Diseases.

The deaths registered as resulting from diseases termed constitutional numbered 2220, that is 1 to every death from all causes. There were 2302 registered in this class the year before.

Consumption, and other causes registered as "Tuberculosis" are in accordance with long usage included in this class, although a more accurate arrangement in obedience to recent discoveries would transfer them to the zymotics. The deaths due to them numbered 1518, being 26 less than the year before.

Cancer is the next most fatal disease of the class and there were registered 324 victims of this disease in the year.

Rheumatism stands next in the order of fatality and its victims numbered 103.

The remaining deaths registered in this class were only 75.

Class V.—Developmental Diseases.

An even 1000 are registered in this class.

Of these 704 were ascribed to old age, 217 to premature birth, 23 to Cyanosis, 18 to congenital malformations.

Stillbirths are not included in this class, as was formerly done, but are enumerated by themselves. See Table XIV.

Stillbirths are not enumerated as deaths in any part of this report.

Class VI.—Local Diseases.

The deaths in this class always exceed those of any other. The registered number in 1889 was 5192, and they were in the proportion of 707 to 100,000 living, and about 41½ per cent. of the total mortality for the year.

This class of diseases is subdivided into orders, according to the different portions of body in which the diseases are located.

Diseases of the Nervous System were registered as fatal in 1609 instances, of which 498 were by apoplexy; 252 by inflammation of the brain or its membranes; 56 by softening of brain; 47 by insanity; 287 by "convulsions," an indefinite term giving but little information about the real disease; 88 by the various diseases of the spinal cord, etc.

Diseases of the Circulatory System caused 928 deaths, of which 764 were registered as by the various diseases of the heart, that is, 1 in 16.4 of the total mortality.

Diseases of the Respiratory System were the cause of death in 1379 instances, or 1 in 9 of all the deaths. Of these, 915 were registered against pneumonia; 324 against bronchitis; and 38 against pleurisy.

Diseases of the Digestive System.—This group contributed 662 to the total mortality of the year. They include 112 from enteritis; 122 from non-puerperal peritonitis; 147 from various diseases of the liver; 65 from various affections of the intestines, etc.

Diseases of the Urinary System occasioned 470 deaths, of which Bright's disease and nephritis numbered 360; and 34 were ascribed to uræmia.

The remaining deaths from the class of "local diseases" comprise 8 of the *Lymphatic System;* 36 of the *Reproductive System;* 69 diseases incident to *Parturition;* 14 of the *Locomotory System*, and 15 of the *Integumentary System.*

MORTALITY FROM PRINCIPAL LOCAL DISEASES—10 YEARS.

Years.	Diseases.										
	Apoplexy.	Paralysis.	Insanity.	Convulsions.	Heart Disease.	Bronchitis,	Pneumonia.	Pleurisy.	Peritonitis.	Bright's Disease, Nephritis and other Kidney Diseases.	Total.
1880	283	324	53	259	527	173	712	22	113	210	2676
1881	308	252	58	258	492	96	713	16	161	216	2570
1882	297	302	55	253	545	92	804	23	119	233	2733
1883	274	293	71	279	588	174	905	22	119	245	2970
1884	309	295	40	102	617	204	694	17	78	300	2656
1885	311	301	59	314	679	245	1025	24	121	325	3404
1886	341	378	37	284	689	197	837	16	127	344	3150
1887	478	119	52	251	739	229	963	28	104	351	3314
1888	468	97	73	267	827	365	1107	27	115	398	3744
1889	498	82	47	287	764	324	915	38	122	403	3480
Average	356.	234.	54.	256.	646.	209.	867.	23.	117.	302.	3069.

Class VII.—Violence.

The number of deaths caused by violence or negligence during the year, as registered, was 580, or 24 more than in the year before, holding the proportion to the total deaths of 1 to 21.6.

Accident and negligence caused 490, while murder, execution, and suicide caused 90; 134 died of injuries received on railroads; 89 were drowned by accident, and 46 were killed by contusions and fractures.

Class VIII.

The unclassified list comprises those in which the certificates of death, through the ignorance or indifference of doctors in many cases, give a cause which is so indefinite as not to admit of any classification. It must be admitted, however, that deaths occur without medical attendance in which all the facts known do not justify a precise diagnosis.

The total in this class was 877 in 1889. Of these, no cause was given in 99, and "Tumors," "Abscess," and "Exhaustion" were the causes given for most of the others.

STATEMENT OF BIRTHS FOR THE TEN YEARS ENDING DECEMBER 31, 1889.

COUNTIES.	SEX.	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	Total for 10 yrs.
Hartford	Male	1,524	1,491	1,488	1,700	1,680	1,744	1,623	1,646	1,663	1,743	16,302
	Female	1,253	1,394	1,483	1,531	1,503	1,544	1,615	1,549	1,592	1,466	14,930
	Not stated	8	15	28	31	27	25	35	46	36	22	273
	Total	2,785	2,900	2,999	3,262	3,210	3,313	3,273	3,241	3,291	3,231	31,505
New Haven	Male	1,995	2,298	2,389	2,594	2,660	2,509	2,631	2,665	2,911	2,901	25,553
	Female	1,848	2,049	2,080	2,333	2,367	2,243	2,298	2,521	2,602	2,758	23,099
	Not stated	12	13	45	55	39	20	17	21	28	19	269
	Total	3,855	4,360	4,514	4,982	5,066	4,772	4,946	5,207	5,541	5,678	48,921
New London	Male	803	839	788	839	808	784	785	826	840	778	8,090
	Female	762	748	794	761	793	754	804	790	809	749	7,764
	Not stated	3	16	7	8	17	19	15	16	6	8	115
	Total	1,568	1,603	1,589	1,608	1,618	1,557	1,604	1,632	1,655	1,535	15,969
Fairfield	Male	1,234	1,323	1,361	1,426	1,314	1,382	1,545	1,737	1,729	1,766	14,817
	Female	1,088	1,108	1,282	1,324	1,303	1,357	1,456	1,497	1,564	1,610	13,589
	Not stated	15	37	24	38	41	46	39	50	43	16	349
	Total	2,337	2,468	2,667	2,788	2,658	2,785	3,040	3,284	3,336	3,392	28,755
Windham	Male	569	546	523	550	516	494	483	482	460	503	5,126
	Female	538	468	520	459	433	474	465	481	429	468	4,735
	Not stated	8	6	10	7	11	9	9	5	11	11	87
	Total	1,115	1,020	1,053	1,016	960	977	957	968	900	982	9,948
Litchfield	Male	534	544	502	563	535	507	417	525	467	534	5,228
	Female	488	485	439	472	469	433	518	465	442	462	4,573
	Not stated	2	6	14	14	8	11	4	8	5	7	79
	Total	1,024	1,035	955	1,049	1,012	951	939	998	914	1,003	9,880
Middlesex	Male	370	356	333	375	416	359	365	385	378	400	3,737
	Female	299	345	341	310	329	340	339	358	351	396	3,408
	Not stated	.....	2	3	3	4	10	3	4	3	4	36
	Total	669	703	677	688	749	709	707	747	732	800	7,181
Tolland	Male	246	263	227	243	238	221	252	260	264	294	2,508
	Female	227	260	255	214	235	206	213	241	237	254	2,342
	Not stated	3	4	2	6	12	5	3	5	8	7	55
	Total	476	527	484	463	485	432	468	506	509	555	4,905
Total for the State	Male	7,275	7,660	7,611	8,290	8,167	8,000	8,201	8,526	8,712	8,919	81,361
	Female	6,503	6,857	7,194	7,404	7,432	7,351	7,608	7,902	8,026	8,163	74,440
	Not stated	51	99	133	162	159	145	125	155	140	94	1,263
Grand Total		13,829	14,616	14,938	15,856	15,758	15,496	15,934	16,583	16,878	17,176	157,064

STATEMENT OF DEATHS FOR THE TEN YEARS ENDING DECEMBER 31, 1889.

COUNTIES.	SEX.	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	Total for 10 yrs.
Hartford	Male	1,129	1,188	1,263	1,422	1,192	1,294	1,238	1,269	1,382	1,310	12,687
	Female	1,007	1,170	1,249	1,264	1,178	1,246	1,161	1,125	1,312	1,245	11,957
	Not stated	26	12	8	20	8	17	10	1	2	2	106
	Total	2,162	2,370	2,520	2,706	2,378	2,557	2,409	2,395	2,696	2,557	24,750
New Haven	Male	1,307	1,425	1,671	1,602	1,622	1,666	1,742	1,850	1,869	1,769	16,523
	Female	1,253	1,365	1,529	1,608	1,521	1,521	1,587	1,728	1,712	1,607	15,431
	Not stated	30	30	27	27	18	16	2	4	3	7	164
	Total	2,590	2,820	3,227	3,237	3,161	3,203	3,331	3,582	3,584	3,383	32,118
New London	Male	667	657	623	712	686	682	623	670	638	641	6,601
	Female	717	675	685	698	700	661	653	652	665	609	6,715
	Not stated	8	8	.....	11	14	10	3	13	3	2	72
	Total	1,391	1,340	1,308	1,421	1,400	1,353	1,279	1,335	1,306	1,255	13,388
Fairfield	Male	953	974	1,048	991	1,050	1,248	1,155	1,211	1,364	1,354	11,348
	Female	875	921	1,037	1,003	935	1,198	1,067	1,197	1,271	1,228	10,732
	Not stated	26	25	17	29	24	19	8	4	1	1	154
	Total	1,854	1,920	2,102	2,023	2,009	2,465	2,230	2,412	2,636	2,583	22,234
Windham	Male	412	353	354	348	313	357	350	364	353	401	3,605
	Female	399	344	318	329	346	331	380	403	404	439	3,693
	Not stated	1	4	7	8	7	9	5	39	4	2	86
	Total	812	701	679	685	666	697	735	806	761	842	7,384
Litchfield	Male	342	381	373	393	373	369	330	381	446	398	3,786
	Female	346	345	362	378	374	358	330	384	412	371	3,660
	Not stated	4	6	6	6	6	6	.....	.....	1	5	40
	Total	692	732	741	777	753	733	660	765	859	774	7,486
Middlesex	Male	258	344	363	389	337	340	321	356	378	348	3,434
	Female	281	329	322	383	331	338	331	347	393	369	3,425
	Not stated	1	.....	2	1	.....	2	4	1	.....	4	15
	Total	540	673	687	773	668	680	656	704	772	721	6,874
Tolland	Male	188	190	191	151	143	189	163	212	187	237	1,851
	Female	175	160	203	168	168	156	153	173	178	174	1,708
	Not stated	4	1	4	2	5	.....	.....	1	1	3	21
	Total	367	351	398	321	316	345	316	386	366	414	3,580
Total for the State	Male	5,255	5,512	5,886	6,008	5,716	6,145	5,922	6,313	6,617	6,461	59,835
	Female	5,053	5,309	5,705	5,831	5,553	5,809	5,662	6,009	6,348	6,042	57,321
	Not stated	100	86	71	104	82	79	32	63	15	26	658
Grand Total		10,408	10,907	11,662	11,943	11,351	12,033	11,616	12,385	12,980	12,529	117,814

METEOROLOGICAL OBSERVATIONS.

Taken in the U. S. Signal Office in New Haven, Conn., since 1873.

Year.	Comparative Temperatures.												Annual Means.	Comparative Precipitation.												Total.
	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.		Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	
1873	24.7	26.9	33.2	44.2	55.9	67.0	72.3	69.0	62.7	52.7	34.0	32.6	47.9	7.55	3.49	4.05	5.79	6.27	2.07	1.55	9 90	2.12	7.18	4.75	4.44	59.16
1874	32.1	28.3	35.0	39.8	56.8	67 4	72.2	67.9	64.8	52.8	41.9	33.9	49.4	4.29	3.86	1.34	7.89	4.92	3.41	4.90	12.99	4.07	1.86	3 44	2.85	55.82
1875	24.2	24.5	32.4	43.0	58.2	67.9	72.5	71 9	62.3	52.9	37.8	32.7	48.4	2.72	3.98	3.24	3.28	2.71	3.50	4.42	5.56	2.10	3.18	7.44	1.39	43.52
1876	34.2	31.2	35.5	47.3	58.8	72.1	77.2	72.4	61.3	51.6	44.2	25.9	51.0	1.54	4.29	10.15	7.65	3.12	1.86	11.05	1.20	5.34	1.07	4.43	2.38	53.98
1877	28.3	35.9	38.0	48.4	59.5	69.5	74.0	73.9	65.6	55.0	46.0	39.9	52.8	2.60	1.07	8.09	3.44	2.14	6.17	2.37	5.69	1.13	10.09	7.11	1.46	51.36
1878	31.9	34.2	43.5	52.4	58.7	66.1	75.1	72.0	65.6	57 0	42.9	34.4	52.8	6.80	6.40	4.18	5.08	3.75	2.62	2.53	4.93	7.67	2.33	6.33	5.50	58.12
1879	27.5	27.6	37.7	46.2	61.4	69.3	73.2	69.6	62.0	59.0	42.3	36.1	51.0	2.69	3.89	5.82	6.08	3.22	4.62	9 50	9.40	2.13	1.41	2.33	4.41	55.50
1880	37.7	35.8	36.7	49.3	64.3	70.5	73.5	70.1	64.3	52.0	40.0	27.8	51.8	3.75	3.80	5.68	3.69	1.24	1.21	4.90	8.14	3.73	4.07	2.82	3.49	46.52
1881	21.7	26.9	36.1	41.1	58.5	62.5	70.7	71.2	69.6	55.9	43.1	37.6	49.8	4.79	6.17	10.42	1.71	3.89	5.14	3.53	2.51	1.45	2.78	4.18	4.75	51.32
1882	26.8	31.6	36.9	43.5	51.4	66.2	71.6	69.7	54.5	55.3	37.8	29.0	48.7	5.91	4.52	3.59	1.55	5.05	2.74	3.03	0.26	13.43	3.54	1.31	2.99	47.92
1883	23.8	27.6	29.9	44.2	56.5	68.3	71.1	67.3	60.1	49.0	42.1	29.7	47.5	3.60	5.00	1.64	2.23	4.52	1 83	5.67	1.26	2.43	5.87	1.56	3.85	39.46
1884	23.2	31.7	33.6	44.9	55.9	66.8	67.8	69.1	66.4	53.2	40.9	31.5	48.8	4.63	5.57	4.15	2.36	3.32	5.26	5.89	5.60	1.41	2 41	2.24	6.41	49.33
1885	26.8	19.7	26.9	46.0	54 9	65.2	72.1	67.8	60.7	51.6	42.4	33.3	47.3	4.05	3.15	1.19	2.31	2.61	1.43	2.51	8.13	0.77	5.37	3.49	3.31	38.32
1886	25.4	26.1	34.4	48.3	56.6	63.2	70.1	68.2	63.2	52.8	42.7	27.3	48.2	3.53	5.95	3.20	3.21	2.74	2.84	4.61	4.56	2.35	1.95	3.83	3.47	42.32
1887	25.2	29.8	31.3	44.4	60.5	65 5	74.5	67.8	59.7	51.1	40.4	32.6	48.6	4.24	6.22	4.22	2.75	0.18	5.62	4.66	4.80	2.21	3.24	2.85	3.09	44.08
1888	20.5	27.8	29.4	44.0	55 0	67.8	68.3	69.2	59 4	46.4	41.4	31.6	46.7	5.48	3.16	7.46	2.57	6.03	2.15	1.76	7.10	7.68	6.46	4.73	5.68	60.26
1889	34.2	25.0	38.7	48.6	59.6	67.4	70.0	68.5	63.0	48.8	44.2	38.8	50.6	4.47	2.08	1.44	4.01	3.81	3.17	17.08	4 38	4.98	3.96	7.78	2.62	59.78
Mean, 17 yrs.	27.5	28.9	34.7	46.8	57.8	67.2	72.1	69.7	63.2	52.8	41.4	32.6	49.5	4.27	4.27	4.70	3.86	3.50	3.27	5.27	5.67	3.82	3.93	4.15	3.65	50.40

METEOROLOGICAL RECORD.—PREPARED BY HENRY J. COX, U. S. SIGNAL OFFICER.

Observations taken at the U. S. Signal Office in New Haven, Conn., during 1889.

Month. 1889.	Barometric Pressure.				Temperature.				Humid.	Precipitation.		Wind.		
	Monthly Mean Barometer.	Highest Barometer during month.	Lowest Barometer during month.	Range of Pressure during month.	Monthly Mean Temperature.	Highest Temperature.	Lowest Temperature.	Range.	Monthly Mean Per cent. Humidity.	Rain and Melted Snow.	No. days .01 in. or more of Rain or Melted Snow fell.	Prevailing Direction.	Highest Velocity.	Total number of miles of movement.
January	30.03	30.61	29.14	1.47	34.2	55	11	44	78	4.47	11	N.W.&S.W.	42	6314
February	30.12	30.85	29.47	1.38	25 0	49	—3	52	73	2.08	11	N. W.	30	5613
March	29.89	30.49	29.12	1.37	38.7	62	22	40	74	1.44	13	N. E.	45	8264
April	29.98	30.46	29.28	1.18	48.6	71	32	39	74	4.01	14	N. & N. E.	36	6765
May	29.97	30.37	29.64	.73	59.6	91	37	54	80	3.81	9	S. & S. E.	40	4775
June	30.03	30.47	29.59	.88	67.4	85	47	38	85	3.17	15	S.	24	4540
July	29.99	30.28	29.65	.63	70.0	88	55	33	84	17.08	18	S.	29	5311
August	30.07	30.34	29 75	.59	68.5	85	50	35	81	4.38	10	S. W.	21	4572
September	30.04	30.32	29.43	.89	63.0	80	42	38	87	4.98	17	N. E.	36	6577
October	30.04	30.43	29.60	.83	48.8	72	28	44	77	3.96	14	N. E.	40	6902
November	30.08	30.65	29.37	1.28	44.2	63	20	43	80	7.78	18	W.	31	5897
December	30.15	30.86	29.45	1.41	38.8	68	8	60	76	2.62	17	N. W.	41	6229
	Mean 30.04	Highest 30.86	Lowest 29.12	Range 1.74	Mean 50.6	Highest 91	Lowest —3	Range 94	Mean 79	Total 59.78	Total 167	N. E.	Highest 45	Total 71,759

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